

Ji {Halberds} & Ge {Dagger-axes} in ancient China

Kenneth Blair. April 2009

"At dawn on the Jiazi day, the {Zhou} King {Ji Fa} went out early to the plain of Mu on the outskirts of the Shang capital, and held an oath-taking. He held a large axe {yellow with gold} [1] in his left hand, and a standard decorated with a white yak's tail in his right, and said, "We have come a long way, people of the west!"

The King then said, "Ah! Lords and ministers of my allied states, chief ministers, ministers of war, ministers of works, ya and lu officials, generals, commanders of a thousand men and commanders of a hundred men; people of Yong, Shu, Qiang, Mao, Hui, Lu, Peng, and Pu: {tribes} [2]

Raise your ge, draw in your shields, lift your spears erect, and take this oath with me....."

{Prelude to the battle at Muye, late 11th century BC [3]. Bamboo Annals chronology 1027BC.}



Figure 1: Shang period dagger-axe. Anyang phase 1300BC-11th century BC. (4)
From the collection of Stephen Selby. See List of Plates index.

Introduction

The ge (Wades-Giles 'ko') or "dagger-axe" 戟 is the most characteristic weapon of ancient China. It was wielded by Chinese warriors from the very beginning of the Bronze Age through to the early Iron Age. Its use in war was both restricted to & consistent throughout the most ancient period of Chinese civilization. For this reason the distinctive form of a dagger-axe seems to me quite symbolic of the ancient Chinese period.

From the early 2nd millennium BC through to the 2nd century BC the ge was used in its many various forms. It went from a rather crude looking implement based on mundane Neolithic stone blades through to a very refined and specialized bronze weapon. The form of this weapon and its method of employment in battle altered dramatically over one and a half millennia. At its most basic essence the ge polearm remained a sharp pointed bronze blade set at an acute angle & secured via binding or a socket onto a wooden pole.

The closely related ji (halberd) 戟 was originally a bronze weapon comprised of 2 parts. The first ji was a composite weapon made from a double mounting of the ge (dagger-axe) with a mao (spear) set above it on a single pole. This provided a greater versatility in application since a ji armed warrior could thrust with the spear point and hook or puncture with the dagger-axe blade.

1) The Chinese characters say "Yellow axe". To quote Carol Michaelson: "{u}till at least the late Spring and Autumn period there was no specific Chinese character for gold. In ancient literature gold was referred to as *huanjin* or yellow metal ". The passage implies this axe, which was also a symbol of authority in ancient China, was covered with gold.

2) James Legge, a 19th century Sinologist, comments: "...at the final struggle of king Wu with the last king of Shang, we find 'the Yong, the Shu, the Jiang, the Mao, the Wei, the Lu, the Peng, and the Pu,' eight tribes from the south-west, having their seats mostly in the present provinces of Sichuan and Hubei, all assisting the former...it does not appear that they acknowledged any allegiance to the House of Zhou. If they did, we may be sure it was nothing more than nominal."

3) The Oath-taking at Mu (*Mu Shi*) chapter from the 'Classic of Documents' (*Shangshu*). Translation by Yang Shao-yun. The Shang dynasty, which had reigned for 500 years was finally defeated & succeeded by the Zhou dynasty.

4) A more corroded but almost identical example exists within the Los Angeles County Museum of Art collection and can be viewed online. Their example is called "Dagger Axe (Ge) with Pig and Whorls" as there is a representation of a boar on the opposite side. The same dagger-axe can be seen in B. Bavarian's 2005 paper as listed under this articles bibliography. That side shows identical artwork to the S. Selby example (Figure 1).



Figure 2: Western Han period dagger-axe. Late 3rd to 2nd century BC.

Jade and stone pre-cursors to the ge.

The ancestral weapons to bronze halberds are found in the Neolithic period. Early stone dagger-axes have been excavated in south-eastern coastal sites and suggest its widespread use as a weapon [5]. Stone ge dated from within the early to middle 3rd millennium BC are associated with the middle Shixia culture of Guangdong. Stone dagger-axes have also been unearthed in the central-plains of China. Stone ge with narrow blades have been excavated from Neolithic Longshan sites and vary in size but have a consistent shape [6]. James Menzies speculated that the shape was perhaps related to the natural shape of a mollusk, as Neolithic sickles with blades of shell have been discovered.

Late Neolithic stone ge are comparable in appearance to the first bronze forms of dagger axe that appeared within the Erlitou culture in the 18th century BC. Even closer in similarities to these stone predecessors are the fine blades of nephrite-jade found in early Bronze Age Erlitou and Shang culture sites. Stone ge have been found at the Bronze Age Shang dynasty site of Anyang, and bear a relationship to jade examples. Jade ge are usually interpreted as ritual objects since they existed alongside the crafts of metallurgy. Such a conclusion is based on their thin blade construction which means a potential for breakage making them unsuitable for combat or for use as a tool [7]. The identification of a particular item as either 'ritual' or 'functional' is often conjectural. Menzies was probably correct that three classes existed: war, ritual & burial weapons. The complication here when considering the meaning of jade forms is that the jade forms appear so similar to Stone Age 'weapon' examples that these original fine dagger-axe of stone would be no less prone to breakage if used in warfare.



Fig. 3: Neolithic or early Bronze Age stone ge.



Fig. 4: Jade ge. Sanxingdui (13th-11th century BC).

5) Yang Hong. 'Weapons in Ancient China'. 1992.

6) James Menzies. 'The Shang Ko'. 1965.

7) Asian Civilisation Museum. 'Mystery Men. Finds from China's Lost Age'. 2007



Figure 5: Jade dagger-axes. Shang Dynasty. 17th-11th century BC.

The earliest weapons of the Neolithic peoples were simply practical tools of ancient men turned against their enemies. A stone hatchet or wood working axe and the hunting bow could equally be used in conflict. Quite where the form of the stone dagger-axe arises from is speculative but it may also be related to an earlier hafted tool. Yang Hong suggests a possible evolution from a harvesting sickle, varieties of which, made from stone or shell, are found in Neolithic sites (Yang, 1992). The evolution from shell or stone into a long and quite slender ge might be reflected in another contemporary object which was also reinvented and evolved. Stone knives provide a paradigm for how other unusual forms like ge evolved from mundane objects of utility.

Ancient stone knives ('dao' 刀) were simple objects comprised of a thin stone blade lashed to a short wooden grip. They have sometimes been called harvesting knives, but could have been used for a variety of purposes. The most basic small stone knives had only a single perforation and an average length close to 10cm across [8]. The Neolithic Longshan culture (2800BC - 1900BC) is noted for jade "square edged dao" [9] which refers to the jade versions of these single edged knives.



Figure 6: Jade knife (dao). Neolithic Period

The same jade dao are also later found amongst the bronze working Erlitou & Shang cultures. Their large jade dao appear to be greatly enlarged versions of the mundane stone knife. Due to the impractical sizes of some these versions these are typically interpreted as ritual objects. One such Shang period example in the British museum was 74cm long with 5 perforations and others of similar size have been found at Erlitou [10]. Another reconstruction of how these blades might have been used shows more robust stone blades, one 26cm in length with 7 perforations, as a chopping tool meant to be lashed to a very long pole and wielded as a weapon of war (Yang, 1992). While a ritual blade based on a harvesting tool is quite reasonable it has also been suggested some thin nephrite blades could even function as a chime during ceremonies if suspended from a frame. Given the size of some examples, and the musical tones that jade can produce this cannot be ruled out either. The ability of jade to produce a clean sound when struck was a feature listed amongst jades "5 virtues" over 2,000 years ago in the dictionary *Shuowen Jiezi* (Wades-Giles: *Shuo-wen chieh-tzu*) [11]. Other small sometimes openwork plaque-forms of jade are representative of the Neolithic Liangzhu culture (3400-2250BC) and are potentially based on stylized harvesting knives. These include the perforations and angular edges, yet have been interpreted as a possible attachment to headgear and are called 'trapezoid ornaments'. This shows the great difficulties in understanding pre-historic objects and the difficulties archaeologists have in pondering any objects that could be considered ceremonial.

These conclusions are not mutually exclusive either. They are each formed largely on the quality of an objects manufacture, the chosen material, its dimensions, and just how far it deviates from the original mundane inspiration.

8) Chad Herrington. 'Early Chinese Stone & Circular Art'. 2003.

9) Angus Forsyth. 'Jade'. 1995.

10) Jessica Rawson. 'Ancient China: Art & Archaeology'. 1980.

11) Richard E. Strassberg. 'Guan Yu Shang Yu/Enjoying Jade'. 1992.

Conclusions over these grand jade versions might be debated but the same difficulty applies to fine bladed "battle axes" & also (*to return to my original point*) any slender stone ge. Any one of these might be called 'ritual objects' when fashioned from jade but the same forms might be called 'weapons' if the construction material was a more ordinary and less prestigious stone, or when they are found in a pre-Bronze Age context.

Jade versions of axes, knives and ge were rendered with especially thin cross-sections due to the admirable translucency of nephrite jade. It is also a much tougher mineral than ordinary stone but in China it seems rarely used for practical purposes. Below is a jade axe from the Neolithic period. It has whitened with age due to an alteration of the polished surface which can occur through microporosity. [12]. Surface lustre can remain from such alterations although originally the nephrite would be translucent. Whitening of archaic jade is an alteration confusingly called 'calcification' although no surface accumulation of calcium carbonate is typically involved. The axe below is likely to be Liangzhu culture, due to the straight angled sides and the gentle curve across the beveled edge. Battle axes in the Neolithic period were also worked of more ordinary stone, like amphibolites (Yang. 1992). Such axes are depicted attached to handles in ancient images both engraved and painted onto Neolithic pottery.



Figure 7: Jade axe (yue) Neolithic. 4th to 3rd millennium BC.

The early styles of bronze ge that existed from the Shang to Western Zhou period also display a visible connection to these Neolithic jade axes. A circular hole is routinely incorporated into the blade on such jade/stone 'battle axes' and these are also transmitted onto certain types of archaic bronze ge. (See Figures 14, 17 & 18). On a dagger-axe this hole has "no structural necessity" [13] and while its retention displays a cultural continuity with the Neolithic period the significance of the feature is unknown. This Bronze Age continuity with the Neolithic is shown in many other ways. Neolithic ceramics, other jade artefacts and certain cultural practices prove that the early Chinese bronze cultures were directly influenced by earlier Neolithic material cultures [14].

The first bronze weapons, and also jade forms of weapons, are best understood as a development from mundane tools of the Neolithic period. What precisely is functional and what is for ritual is not a point to labour here. Suffice to say the Neolithic forms can be seen to be the predecessors to early Bronze Age weapons. Only in later periods with greater evidence for associated rituals & belief is there some insight over an objects intention. One example is the use of a particular form of yue (axe) in the Shang period associated in archaeological contexts with ritual mass-killings & human sacrifice [15]. The axes often depict leering or fanged faces or the disembodied eyes of the Taotie spirit. This demonstrates how even unusual or heavily ornamented objects can be both *functional* in a limited application & remain true *ritual* objects at the same time.

Again in a slightly later context evidence is available that shows certain jade blades & dagger-axe forms were used exclusively for ritual & ceremony. Such jade ge & 'zhang' (Wades-Gilles "chang") were not hafted to a pole. Jade blades were buried, some in containers, within sacrificial pits at Sanxingdui. The ge form itself would have had symbolic meaning to ancient people as did the motif of a battle-axe or harvesting tool. The use of blade forms in rituals by the living can at least be proven by the evidence arising from a 13th-11th century BC site in Sichuan province.

12) Hsien-Ho Tsien & Jiann-Neng Fang. 'Mineralogy & Alteration of Chinese jade'. 2002

13) Henry Trubner. 'A Bronze Dagger Axe' 1959.

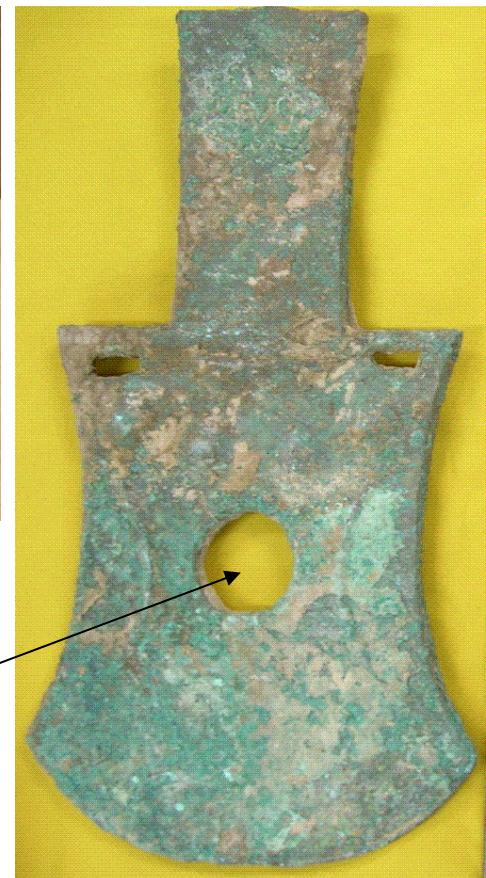
14) Corinne Debaine-Francfort. 'The Search for Ancient China'. 1999.

15) Denise Dersin, Charles J. Hagner, Jenny F. So, Robert L. Thorp. 'China's Buried Kingdoms'. 1993.



Shang period axe. Figure 8 (above). This axe was one of two axes recovered from a tomb which had been used to decapitate 48 associated human sacrifices.

Figure 9: (right) Shang/West Zhou axe with central blade perforation.



The dagger-axe is the probable origin of a particular blade-like ceremonial object called the '*zhang*' which was used in rituals & placed in sacrificial pits at Sanxingdui. For this reason the line between common stone hatchet, then thin battle axe, stone *ge* & then ceremonial jade *zhang* could form a certain progression along a scale from mundane Neolithic tools toward purely ceremonial. As an illustration of the use of a *Zhang* jade a small bronze figure excavated from Sanxingdui (Sichuan), dated to the 12th century BC, shows a devotee kneeling with a *zhang* blade grasped at the base & held vertically in outstretched arms in the manner of presenting a tablet. Dagger-axes recovered from Sanxingdui sites have been interpreted as ritualistic offerings only, but have a practical blade design. Savage looking serration on blades of some Sanxingdui *ge* mean the use of *ge* in war is likely: an absence of evidence is not evidence of absence. The Shu culture of Sichuan which followed the Sanxingdui culture certainly did wield the bronze *ge* in war. Apart from their legendary origins another indication of cultural connection between the later Sichuan cultures are sets of excavated bronze dagger-axes buried unhafted in batches of 5 to 10 within earthenware jars during the 4th century BC. [16]. Ancient Sichuan was both linked to the central Chinese plains in the north and Sino-Viet cultures to the south, as will be discussed in greater detail later. All the ancient Neolithic cultures, while having certain distinct features, have enough common attributes to both show indirect exchanges & diffusion of artefactual types across much of modern China. It has been suggested that the *zhang* blade may have originated in the Chengdu plains where Sanxingdui is located, and was transmitted north, yet there are similar *zhang* represented in the distant east coast Neolithic Longshan culture. Other jade forms, like collared discs, are shared between cultures. (Forsyth. 1995). The *zhang* can be identified by its notched silhouette and angular form in which it deviates from the more literal & martial form of jade *ge*. As with early bronze ritual vessels the use of bold silhouettes may suggest an object which is meant to be viewed in a ceremonial setting, specifically a form that has an impact when viewed during a public ritual.

Another example of continuity over a truly huge expanse of time was the use of jade tablets as trappings of authority. Bureaucratic administrators in both the ancient dynastic & later Imperial periods carried plaque-like objects with a link in the pre-historic era.

Gui tablets (Wades-Giles "kuei") used by officials in government link across millennia to Neolithic *gui* tablets. The *gui* is a thin blade-like object which possibly evolved from the jade *ge* or axe. The persistence of these items as trappings of the elite, required for mediation with the powers that be, suggests the erudite scholar dealing with the Emperor had continuity with the ancient Shaman communing with the divine. Six forms of ritual jades are dictated in the classic rites of Zhou ("Zhouli" allegedly a Zhou period constitution) which include both *zhang* blades & *gui* tablets. Confucius (551-479 BC) dictated secular court ritual in his Analects. He described the precise aesthetic manner in which an envoy would approach his Lord with correct bearing and movements while "grasping the jade tablet".

16) Alain Thote: 'Ancient Sichuan: Treasures of a Lost Civilization' 2001



Figure 10:
(above) Three "Xia"
gui tablets at left.
Three zhang tablets
at right.



Figure 11.
(right) Sanxingdui
jade ge. 13th-11th
century BC.



Figure 12.
(far right)
Sanxingdui zhang.
Zhang were found in
both Pit 1 & Pit 2.
13-12th & 12-11th
century BC
respectively

Jade tablets of the Spring & Autumn period used in matters of state or sacrifice still resembled Neolithic *zhang* (Rawson 1980). As late the Qing period (1644-1912 AD) Confucian protocol was still influential at court. The Qing Emperor Qianlong (1711-1799 AD) was an avid collector of original Neolithic objects like *gui* and inscribed his seal and poetry onto the ancient blade-forms. Examples of Neolithic jade *gui* from his personal collection can be seen in the National Palace Museum at Taipei.

Early Bronze Age: Erlitou Bronzes

The time between the Neolithic & the Shang period corresponds to the Xia dynasty period of Chinese tradition. In the absence of a written record from this time, or positive identification of a city from the ancient histories, it is more processually appropriate to discuss known artefacts & sites as "Erlitou"; named for the location in Henan province where this culture was first discovered. The earliest Erlitou phase predates the Shang period, while later phases likely overlap with the early Shang period (So & Thorp. 1993). Erlitou is a true bronze culture which bridges the gap between the late Neolithic & the Bronze Age Shang. While dates assigned to the Erlitou culture by authors vary the period of 1900-1600BC tends to be a consistent mean range. This is the earliest period of extensive and diverse use of bronze technology in China but precisely how this arose will need to await further discoveries. Very early forms of mainly forged copperware were worked in China before the Erlitou period, most notably by the Qijia culture (Wades-Giles *Chi'-Chia*) of Gansu province on the north-western periphery of China in the late 3rd millennium BC [17]. While this falls short of true bronze small amounts of copper and tin-bronze objects have been found in Henan & Shandong associated with the Longshan culture of the east coast Neolithic (Yang 1992.). Despite such exceptional early appearances the age of bronze metallurgy had not yet fully begun. Across several Gansu sites there is neither consistency in the method of working nor the chosen alloy composition that would allow comparison to the Erlitou or Shang bronze artisan's mastery.

While Qijia culture tools like knives & axes were made from mixes of copper with traces of lead or more commonly almost pure copper (Yang. 1992) these copperwares are almost an anomaly when a fully formed bronze culture would not appear in China until over a thousand years later. Whether the Qijia cultures metal working was as a result of diffusion from the "West", or arose independently and then declined independently, the forming of wrought copper-alloys by heating and hand working is not a technology later associated with the Chinese bronze age [18]. Any connections to the sophisticated bronze casters of the Erlitou & Shang are unclear and it appears to have been a dead end. In contrast though, the Longshan culture of the East coast is certainly linked to later emerging Chinese bronze cultures.

17) Nicola Di Cosmo. 'Ancient China and its enemies. The rise of nomadic power in East Asian History.' 2002.

18) Professor Behzad Bavarian. "Unearthing Technology's Influence on the Ancient Chinese dynasties by Metallurgical Analysis. 2005.

Longshan style jade-working, certain ceramic styles and scapulmancy were all inherited by the Shang dynasty. Bronze working in China was also from the onset almost exclusively based on casting. It can be reasonably concluded that this was a geographically independent invention. Such smelting & refining of metals could arise as a by product of the Neolithic ceramic industry. The East coast Neolithic cultures of Longshan & Dawenkou were already producing very delicate thin-walled vessels and complex burnished ewers & goblets before the Erlitou period. Mastery of furnaces and skill with ceramics would aid in development of molds for casting. Just where & how this happened is speculation. Once discovered, bronze working then evolved along very different lines to the Western method of bronze working. Enigmatically some early Erlitou & Shang ceramic vessel have features that suggest a possibly mimicry of sheet metal vessels, although sheet metal examples have not been discovered (Rawson 1980). It can be speculated that there is an as yet unknown phase which precedes the emergence of a fully formed bronze culture like Erlitou. Erlitou casters however had already turned away from the formation of bronze by heating, annealing and hammering and instead developed the use of multi-sectional molds (Bavarian 2005) which set the pattern for the remainder of the Chinese Bronze Age. I will discuss more on the technology of bronze working in ancient China in a later section.

Now that bronze was available for tools or vessels the earlier jade forms of ge also began to display changes that distinguish them from stone-age predecessors. Amongst the jade working at the birth of the bronze age the dao, zhang & long fine bladed jade ge were still retained (Forsyth 1995). Erlitou jades were now often adorned with surface patterns and inscribed lines, some of these being raised lines left after grinding down the nephrite either side. Another aesthetic feature of jade ge in the Erlitou and Shang period is a notched outline added to termination of the tang of jade dagger-axes. While Erlitou sites represent the first fully fledged bronze culture in China it was also the dawn of the manufacture of true bronze weapons. A new class of weapons made of bronze arose which were unrelated to any possible utilitarian function as tools, and amongst these are the first bronze dagger-axes. The types of Erlitou ge so far uncovered are limited in their variety and are of rather crude design. One type is a bronze blade with a downwards curving tang which is similar to a type used by the Shang (figure 16). Another is simpler, being a pointed bronze blade with no distinction between the tang and the blade and a perforation at the butt end to allow for binding to a handle. It shows no great innovation when compared to the Neolithic stone ge in figure 3. The only distinction is a notched detail to the base of the tang which is similar to contemporary Erlitou jade ge. A third type of weapon is sometimes called a 'hatchet' (*qi*) and appears like a dagger-axe but without a sharpened point to the blade, appearing something like the middle zhang blade in figure 10. Apart from the first type with the downwards curved tang the basic blades show an almost straight adoption into bronze from stone proto-types.

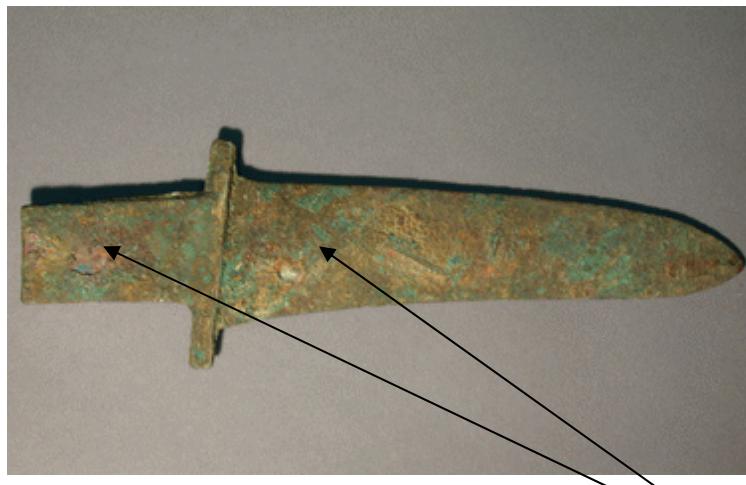


Figure 13: Primitive form of bronze dagger-axe. Nei & Yuan

Shang Dynasty Dagger-Axes: The early historic period

The next phase in the early Bronze Age is the **Erligang** period of the Shang dynasty (approx 1600-1400BC). The dagger-axe above represents a fairly undeveloped form of ge. Notable is the addition of crossgauards between the blade & tang which is thought to be a Shang innovation. They can be seen on Erlitou 'qi' but not on their ge. A slight arch of the blade can be seen here too. A further refinement, but this is quite crude compared to what was developed later.

In further discussion of dagger-axes/ge I will start to employ some Chinese terminology for parts of the ge. On these early Shang dagger-axes we see the division made above by the projecting guards between the "yuan" (blade) and the "nei" (tang). One oddity about Figure 13's dagger-axe is that there is no perforation on either *yuan* or *nei* to aid in binding a handle. Such a weapon could be bound around the guard projections when it was hafted.

Several advancements and new types of ge can be seen by the late Shang period (13-11th century BC). Figure 14 shows the many varieties of dagger-axe found during the late-Shang **Anyang** period. All these forms existed contemporaneously.

Shang dagger-axes can be divided primarily by several attributes. The blade shape (*yuan*), the addition or absence of projecting guards, the shape of the tang (*nei*), the location of any perforations and most importantly a division between those with a blade extension (*hu*) and those without. The presence or absence of inlay or art is irrelevant to military efficiency although they reveal aspects about Shang society.



Figure 14. Late Shang & Early West Zhou ge 13th-11th century BC.

The ‘hu’ extension was a feature which only arose in the late Anyang period (Yang 1992.) which was near the terminal date of the Shang dynasty. The *hu* was a projection of a blade down the pole which allowed for a larger and more versatile cutting surface as well as for extra perforations for binding to the pole. This is an important innovation since it was the beginning of an evolution from ‘archaic’ ge into the later style of ge where the *hu* extension was universal. The lower 2 versions in Figure 14 show the ‘hu’ blade extension as it first began to evolve. The lower right version is labeled West Zhou but represents the military technology which was developed by the end of the Shang period: projecting guards divide the *nei* & *yuan*, the blade in-turns and there are holes for binding on the blade extension. This is the ancestral weapon to the ‘classic’ form that then persisted to the end of the dagger-axes tenure on the battlefield (for the final appearance see Figure 2: Han-era ge).

While the early style dagger-axes had straight edged blades or a slight arch the additional improvement of including a true in-turn to the blade meant a superior weapon when used in a hooking or dragging cut. When in the late Shang the addition of a ‘*hu*’ blade extension was added the area of blade available in a hooking cut was improved also. Figure 19 represents a very early and basic extension of the *hu*, with only one perforation added for binding. Figure 21 shows the more advanced design with a longer extension and a more noticeable in-turned blade. Shang dagger-axes with *hu* may have one or two perforations although rare examples exist with 3 or 4 perforations. The West Zhou example in figure 14, lower right, shows a 2 perforation *hu* such as was developed by the late period Shang. Another improvement which appears by the end of the Shang period was the angle which the blade was set against the pole increased rather than just a straight right-angled mounting. Instead of 90° then blade may be offset by up to 102° from the pole. In the manner of a curved saber or scimitar this meant a blade naturally dragged at the flesh with swept in an arc or when a person was caught in a hooking motion. These features combined meant a more effective weapon.

An earlier and more ‘archaic’ style which lacks either of these mechanical benefits is the blade type shaped essentially like an isosceles triangle (Figures 17, 18). Over time these become longer and thinner and some even developed an in-turn but the connection to the Neolithic remains clear. The central picture overleaf (figure 17) is of the broadest style of this triangular blade, Max Loehr calls these a ‘*k’uei*’ to distinguish it from more slender ‘*ge*’ [19].

Longer blades appear to have evolved from *k’uei* (such as *ge* figure 18). Both types continued to be used in the Western Zhou period. Oddly, many forms existed together at the end of the Shang dynasty but the more advanced forms only appeared late, and others would soon disappear. The archaic form of triangular blade was also adopted by many peripheral cultures long after Huaxia Chinese abandoned them. Finds of ‘Shang style’ weapons then occur long after they were obsolete within the Zhou cultural sphere (Trubner. 1959) I will discuss these frontier peoples later. Note also the inlay of turquoise on the tang of both 17 & 18. Figure 17 is very close in both form and inlay to the *ge* in the upper left in figure 14. Again this is an example of motifs being popular at a point in time & cultural conservatism even amongst the vibrant art of the period. The art that decorated the weapons of those powerful enough to commission them was still influenced by the fashion & conventions of their period, hence repeating motifs.

19) Max Loehr: ‘Chinese Bronze Age Weapons’. University of Michigan Press. 1956



From top & left: Figure 15, then Figure 16 (at right). **Second row:** Figure 17, **Third row,** From the left; Figure 18, then Figure 19 (at right), **Bottom row,** from left: Figure 20, then Figure 21 (at bottom right.)

The position of a hole on some blades of this style of archaic/triangular dagger-axe shows continuity with the Stone Age. Holes on the blades (*yuan*) serve no function in binding or attachment yet seem more related to the style of ancient stone & jade axes. Figure 20 in comparison has no superfluous hole on the blade but has a more practical hole for binding on the *nei*.

At the top row of the previous page are figures 15 & 16, which form less common & distinctively Shang styles of weapon. 16 is a downwards curving *nei* style that first appeared in the Erlitou and was not adopted by the following Zhou peoples. These downwards pointed *nei* are decorated with patterns or inlay as standard yet it appears the method of hafting compared unfavourably with those that persisted into later periods, so these fade from history. Also destined for obsolescence was the type of *ge* in figure 15. This had a socket cast into the *nei* to allow an oval cross-sectioned pole to be inserted (a digital representation of a pole has been added for clarity). This was a more complex construction to cast from bronze and seems to have bought little benefit. It then fell out of use in the central plains of China (*zhong guo*) with Western Zhou examples being rare. Oddly a similar form was used into much later times within the "northern cultural zone" which extended into the steppes [18]. It could be suggested the use of a socket itself, as opposed to a tang & binding method of hafting, may have even been an adoption of more steppes & 'western' style of mounting weapons in the first place. Socketed axes exist from very early times in the northern cultural zone. It seems the binding method can be primarily associated with Huaxia Chinese, while the socketing method seems more associated with peripheral peoples.

While the ancient origins of the *ge* are well established there is also evidence for the *ji* (spear & dagger-axe mounted on a single pole) during the early Shang period. The *ji* at this time was not used so extensively as in the later Bronze Age and evidence for its use is comparatively slight. Excavation has revealed a 'ji' composite mounting preserved in-situ (Yang 1992). The position of a spear above a *ge* can be still traced although the wooden pole had long decayed. The Shang *ji*'s pole was calculated as being 64cm long. One reason to not identify the *ji* as a notable Shang weapon is because such early bronze dagger-axes were typically mounted on such short poles. Excavations that show poles of 60cm tell us that close combat really was in-close & personal rather than conducted with longer pole weapons. Such a short pole weapon would be best suitable for a swinging puncture attack in close combat. The Shang weapons of greatest preponderance on the battlefield were therefore the dagger-axe (Rawson 1980) and the spear separately rather than the *ji*. Contemporary Shang images show warriors wielding such short pole mounted *ge* single-handed with quadrangular shields in the other hand [20]. The character & radical 'dun4' (shield) in modern times is related to this early form of shield rather than the more complex or gourd shaped shields of later eras.



Shang Warriors with ge & shields. Authors Illustration based on Shang-era inscriptions. At left (A) an archaic form of ge shaped like an isosceles triangle. The figure (B) at right has the ge which first appears in the Anyang period 11th century BC with a short blade extension down the pole ("hu").

(#A) This figure appears in "Ancient Chinese Armies 1500-200BC". 1990.

(#B) Appears in "Ancient Chinese Weapons: A collection of pictures". 1990.

The antiquity of the *ge* is also shown also by its presence in the pictographic characters of the late Shang period, which in turn influenced traditional Chinese script up until the modern age. The written character for *ge* in traditional script is the radical component of many words related to martial activities. The original pictogram of the late Shang period is a literal representation of the archaic form of dagger-axe. On oracle bone inscriptions the form is made of incised lines but the components are still present. The triangular bronze blade and tang for attachment is shown even more clearly in the pictogram of the type inscribed on metal. It represents an example of the archaic style of *ge*. [19]

Both the archaic & transitional character below are from bronze script ('jin wen') however the centre character is closer to the style which became standardised in the 3rd century BC which influenced traditional script to the present.

Archaic pictogram transitional character traditional Chinese script



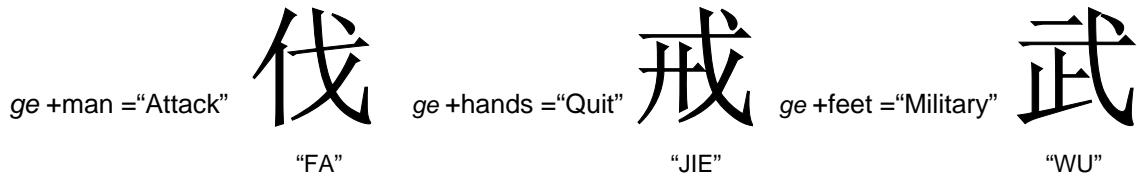
20) In "Ancient Chinese Armies 1500-200BC" an image of a man in profile with a sack as a burden on his back has wrongly been interpreted there as an oval shield being carried. This was a mistake with an ideogram clearly traced to the modern character 'zhong4' meaning "heavy". The earliest shields were quadrangular. This persists in the modern character 'dun' (shield) as a cross.

"盾" (see Guanghui Xie: 'Illustrated Account of Chinese Characters' for examples of the Shang & Zhou ancestral characters.)

21) Cheng Dong & Zhong Shao-Yi. 'Ancient Chinese Weapons: A collection of pictures'. 1990.

22) Cecilia Lindqvist: 漢字王國 1989.

Various words were created by combination or association with the ge character. These for example might form martial orientated phrases (modern examples below):



The ancient meanings of these characters have undergone some transformation since they were first carved onto bone or inscribed on bronze [23]. The character 'jie4' (quit) originally meant "*to guard against*" and the foot component of 'wu3' (military) is the character 'zhi3'. *Zhi* evolved to mean 'stop' rather than 'foot'. Thus the original *wu* ideogram represented weapons & feet with a meaning of marching to war. The foot component acts as a causative alongside a weapon. While such meanings changed with time the origins of the characters and the importance of the *ge* as an infantry weapon of the ancient period is still clear. The *ge* radical appears in a great many modern characters.

While the *ge* was made in a variety of styles and underwent various developments during the Shang period it may have been due to the *ge* being mounted on short poles that the *ji* arrangement was comparatively little used at that time. Since the *ge* was wielded like a long handled tomahawk or war-pick (hacking or puncturing in close fighting) and was not employed as a long ranged pole arm a combination with a spear on such a very short pole did not lend a great deal more utility for an extra expenditure of bronze. While bronze was appropriated by powerful nobles for huge and heavy bronze cauldrons (*ding*) and ritual vessels, bone arrowheads were still used alongside bronze arrowheads in the early Shang period. Bronze was controlled by the ruling elite and was in itself a source of power which gave advantage over non-Shang peoples whom they warred against. For infantry based armies, and with chariots appearing on the battlefield only in the late Shang period around 1300-1200BC [24] a short & fairly simple bronze infantry weapon was adequate. In much later periods, such as the Eastern Zhou period & notably the Warring States period, the combination *ji* was extensively used as a polearm & it became a more common weapon. Although there are almost no examples in the Shang period the double mounting of spear & *ge* (*ji*) were widely used in later eras. The period where the *ji* (combination spear & *ge*) was first clearly used to a notable extent is the period of the **Western Zhou** (11th-8th century BC).

The Western Zhou & further innovations.

The Western Zhou *ji* (halberds) were different to the preceding Shang and later (East Zhou) periods in that their weapons were often cast as a single bronze item with the features of both dagger-axe and spear combined in one. There were two possible methods to attach such halberds to the pole. Some West Zhou *ji* used the socketed method of the spear portion to attach, while others used the slot of the dagger axe portion and were bound via holes in the typical *ge* hafting method. These *ji* might be described then as a "spear with dagger-axe blade" or a "dagger-axe with a spear point" based on the method of their hafting. Yang Hong also uses the expression "*gou ji*", that is, "hook halberd" when discussing another special type of West Zhou halberd. This I gather to mean a *ji* like figure 25 with *nei*, *yuan* & spear tip turned inwards. The appearance is like a blade which curls in on itself. The *gou ji* style looks elaborate but impractical and I doubt it would have much of a place on the battlefield.

Some of the more literal forms of combined halberds with conventional blade points & edges however look like entirely practical and versatile weapons. Of the 2 types of West Zhou *ji* cast as a single unit, based either primarily on a spear or a *ge*, the socketed type of *ji*, attached like a spear, was less common (Yang 1992.) Most the West Zhou *ji* halberds of this one-piece type were mounted like dagger axes by slotting into the pole, such as figure 22, 23 & 25 below. Figure 24 is a *ge* mixing attributes of the robust *dadao* (literally "great knife", a broad pole-axe) with the angled blade of a dagger-axe.

The earlier 'combination' type (a separate dagger-axe and separate spear mounted together) was also used in the Western Zhou period, so both one-piece & two-piece halberds existed. Later the two-piece halberd became the main type of bronze *ji*. In the Eastern Zhou period in contrast there seems to be little or no evidence that *single cast* items were used. One possible reason why the 2 piece type may have became more common was any damage in battle to a two piece *ji* for example would mean a replacement of just the damaged component (spear or *ge*) rather than the need to replace or recast the entire unit. The precise reason for the trend however is unclear.

The Western Zhou dynasty inherited/adopted the military technology of the Shang & then developed the basic Shang dagger-axe further over the following centuries. New forms like above as well as redesigns gradually appeared. The dagger-axe still remained the primary combat weapon throughout the era. The final Shang form with the *hu* extension and perforations was the favoured style and after further development this produced the 'classic' *ge* inherited by the Eastern Zhou states. The battlefield chariot had appeared at the end of the Shang period, almost certainly adopted from vehicles used by the steppes peoples outside China. It appears suddenly in the archaeological record, alongside evidence of artefactual exchanges between Shang and steppes cultures found in both zones (Rawson 1980.)

23) Guanghui Xie: 'Illustrated Account of Chinese Characters'. 2003.

24) Patricia Buckley Ebrey: 'Cambridge Illustrated History of China'. 1996



Figures 22, 23 (left-right)
West Zhou ji. One piece halberd.
Nei {tang} of similar West Zhou ji fragment.
Archaic form of Chinese character possibly 'jing' {capital} cast into bronze.



Figures 24 & 25 (left-right)
West Zhou ge with dadao attributes.
West Zhou gou ji halberd.

The Zhou may potentially have had an earlier familiarity with chariots than the Shang given their geographical homelands to the west of the Shang domain. Such chariots were an important component of Zhou armies up until the Warring States period. The chariot of the ancient battlefield had a crew of three, an archer, a driver and halberdier/spearman. The number of horses varied, normally from two to four. In the Zuo zhuan chronicle for Duke Yin of Lu (8th century BC) his army was specifically said to be comprised of chariots, while the barbarian Northern Rong fought on foot. In rugged terrain infantry were advantaged, so a feigned retreat was arranged to lure the Rong force into the open. The pursuing detachment of the barbarian tribesmen was then "cut to pieces" on the open field [25].

A chariot, and the numbers that could be fielded was also an expression of the rulers might which made a statement to his peers. This aspect of the Zhou culture persisted quite late. The arrogant Second Emperor of Qin even in the late 3rd century BC, as his people groaned under his oppressive yoke, said:

"In name we are lord of ten thousand chariots, but not in fact. Thus I want a retinue of not a thousand but ten thousand chariots to match my title." [26].

25) James Legge. 'The Chinese Classics'. 1898.

26) Arthur Cotterell: "The First Emperor of China" 1981.

In the late Shang & Western Zhou period large pits lined with battle-ready chariots, sacrificed human attendants & harnessed skeletal horses, surrounded tombs to confirm the occupants status. These expensive war machines were decorated with bright bronze fittings, rattles and bells & highly ornate axle pins. In 2005 I was fortunate enough to view 2 West Zhou chariots in-situ near Xian (Pit #2 at Gengao). Most memorable were the faces on bronze frontlets of the horse's harnesses, linked cowries shells from a distant ocean which traced out the long-decayed reins and a pair of bronze blades projecting either side of one chariot's halter.

The time of the Western Zhou, 1027BC to 771BC, is the origin of the *shi* warrior class. The *shi* were a minor noble class arising from the Zhou feudal system that can be compared to Western knights of the middle-ages. They were taught charioteering, archery, ritual and conduct as military training. It was from the romanticisation of these warriors the concept of 'chivalry' arose during the Eastern Zhou period [27]. The period was likely not quite as romantic as later philosophers might have it, given the continued practice of human sacrifice and many conflicts with barbarian tribes both inside & out, but certainly there was a different prestige between the warrior that fought from a chariot, and the infantry that accompanied chariots. With changing times in the 6th century BC Qin state was turning its back on feudal systems & standards. During a process of switching to infantry armies during the late Spring & Autumn, the ancient Zuozhuan commentary notes that execution was the penalty for those who would refuse to comply & fight on foot (Di Cosmo. 2002). While dagger-axes on very long poles were more suitable for fighting from chariots a quite short pole was still used in the West Zhou period (Cheng & Shao-Yi 1991) Archery from chariots may have taken more prominence in the early period. The extremely long poles of the Spring and Autumn period do suggest some specialisation for chariot warfare occurred later.

The form of dagger-axe as used in the Spring & Autumn period first appears in the late West Zhou era & so it is likely the evolution of longer pole weapons also occurred before the beginning of the Spring & Autumn period. The actual transition of course would be more gradual than the arbitrary division of artifacts into periods based on an era's political history. i.e: Late "Western Zhou" & Early "Spring & Autumn" periods are not entirely relevant divisions for military technology as material reality is part of a separate continuum. West Zhou dagger-axes in the early period begin essentially the same as those of the late Shang but then a certain progression can be seen. The dagger-axe began to evolve more along the line of the 'classic' ge such as was later used in the Spring & Autumn period. A blade set at an angle $>90^\circ$ - 100° became more prominent over time rather than an in-turning blade. By the late West Zhou a mechanical cutting action on a pull seems favoured over the hooking action, hence the angle. Given that the chariot was a basis for warfare it can be hypothesized that an upwards angled blade would suit a mounted warrior. The cutting action would be on the pulling away, even as a chariot swept past, rather than an inwards hooking blade where the weapon might even be caught on the enemy's body or swept from the wielder's grasp. This blade angle will be more upturned when we reach the Spring & Autumn period. The purely 'West Zhou' period features, rather than these late-period innovations, I will now briefly illustrate.

The examples 26-28 do not yet show the distinct upwards angled blade. This became more prominent over time so I will discuss these improvements under the Spring & Autumn section. More specific to the Western Zhou period are several features which were improvements on the Shang weapons. One feature that appears firstly at this time is a "riser" in blade terminology. This is a raised central line, like a ridge or spine, which strengthens a blade structure without needing a heavier and thicker casting (Figure 26). A riser can conserve weight, and thereby bronze, but still adds to the robustness of the blade.



Western Zhou ge: Figure 26

27) Jian Zhao: "The Early Warrior and the Birth of the Xia". 2001



Western Zhou ge: Figure 27 & 28 (above: left & right)

Western Zhou ge: Figure 29 (below)



Figure 27 & 28 both have a Shang style arch & simple *hu* with a single perforation yet for the first time we see both perforation on the *hu* & *nei*. This is another step in the evolution towards a 'classic' ge form. It aids in binding to the pole & means a more secure fixture. Also aiding to the securing to a pole, but not a trait that was passed onto later dagger-axes, was a pair of flared 'wings' on the area where the *yuan* & *nei* meet. Figure 29 is an example with these projections, and it also has an upwards angled blade vis-à-vis the pole alignment.

Another popular West Zhou detail is the depiction of a beast face on the *yuan* (a repeating motif on the Western Zhou ge, often interpreted as a tiger). The ears of the beast could project three-dimensionally, forming the additional point for securing the pole. This feature seems to have had rather less benefit for the extra manufacturing effort involved and so, like the socketed *nei*, it died out in the central plains but again persisted amongst tribal peoples on the edge of the Zhou cultural sphere. Projecting 'wings' such as first seen at this time can be found many centuries later, far from the point of origin, on the bronze weapons of people very different to the Huaxia Chinese.

The archaic 'triangular' blade style such as used in the Shang period had continued use during the Western Zhou period (such as figures 17 & 18), with both the type with the perforated *nei* & the perforated *yuan* existing. Slight new variations of these appeared which can be classed according to the shape of the edges along the blade, and those with an in-turn to the point (Cheng & Zhong. 1990) but they still remain essentially archaic with marginal differences. These styles were gradually less used than the style with the *hu* blade extension down the pole. Outside of the central plains the southern tribal cultures such as the Ba, Shu, & Yue adopted this isosceles triangle weapon-form. Late Bronze Age versions based upon the archaic forms of bronze dagger-axe were still being used by the Dian bronze culture of Yunnan in the late 2nd century BC when Western Han armies began to encroach on the region.

I will now discuss some of the features of dagger-axes found amongst the cultural zones then considered peripheral to ancient China. People external to the 'Zhong Guo' {Middle Kingdom} were considered barbarians by their Huaxia Chinese contemporaries. What small amounts were written by ancient historians about the peripheral peoples was written by the victors. Under a Chinese paradigm a barbarian's lack of civilisation was understood to increase proportionately with increasing of distance from the Middle Kingdom.

For all their material differences though the voiceless peripheral cultures were equally as remarkable societies as the central culture.

Weapons of the frontier cultures: Dagger-axes on the periphery of Zhou China

In the most southern extent of China it has been suggested that the central plains style of ge appears in the archaeological record, adopted by southern Yue peoples, around the time of the Western Zhou [28]. In Sichuan in the south-west of modern China there are examples of the archaic form of Shang/West Zhou ge still being used as late as the 4th century BC.

As early as the Neolithic period there is evidence for exchange of motifs & artefactual styles that shows connections between groups across vast distances. In this way the impact of the bronze-working states of Zhou amongst tribal peoples that bordered them is not surprising. The distribution of certain types of collared jade discs/bracelets which occur both on Shang sites & Dong Son & Ban Chiang culture sites hints at ancient interconnections even into south-east Asia, beyond the modern borders of China. As we draw closer to the central plains the connections become clearer and more definite. In Sanxingdui for example a Shang-style bronze ritual vessel was used as a container within a sacrificial pit, and it is certainly an import from along the Yangtze river (Asian civilisation museum/Singapore 2007). Scientific investigation of such bronzes has even linked both the ancient Shang city Anyang and its contemporary Sanxingdui to a trade route as far south as modern Yunnan province. Lead isotope analysis, which detects a unique signature that can trace lead to a geological source, has been found both in bronzes from the Shang consort Fu Hao's tomb, bronzes from Xin'gan in Jiangxi and the bronzes of the Sanxingdui culture. Lead used in these bronzes came from the same Yunnan source [29]. By the time we look at distant Yunnan, which only first came under the direct influence of Chinese in 109BC, we can see that the Yunnan cultural sphere also has connections to pre-historic Vietnamese artefactual styles. There was an interconnection between all such diverse groups that never required meeting face to face. In the far south of China in Guangxi province one such example is the dagger-axe, although it is rarely found amongst excavated weapons assemblages. The dagger-axe appears to be a weapon with some utility in chariot warfare, but not so widely employed by people that lived in the southern regions along its rivers and vegetated hills away from the central plains.

The people in the most southern part of modern China were in ancient times known as the *Bai Yue* {"Hundred Yue Tribes"} (Barlow, 1996). Since the terrain was unsuitable for chariot warfare the type of favoured weapons amongst Southern Yue tribes appear to be axes. The name Yue is even suggested as a cognate word for these people, *yue* also meaning "axe". Dagger-axes were outnumbered by battle-axes in the excavation reports of Yue sites cited by Jeffrey Barlow. Even as the influence from the northern style of weapons was felt a proportion of 56 axes for only 12 dagger-axes were discovered in tombs said to date to the Spring & Autumn-early Warring States period. This shows persistence in Yue cultural preferences even as the pace of contact with the Zhou sphere increased. Chu state is one particular source which filtered central plains Zhou culture to the southern tribes. One mechanism for the Yue peoples to encounter foreign weapons styles was through the use of southern Yue auxiliaries in Zhou armies. Excavations of late Warring states-era graves in Guangxi contained weapons which show signs of use, clearly having been re-sharpened & with the names of Warring States battles inscribed onto several (Barlow, 1996). Dagger-axes were still rarely found amongst such excavations. We can see that such weapons show an external influence during the Warring States period into Guangxi. Such objects are visibly influenced by the contemporary central plains style of dagger-axe. (see Yang, 1992). Fragments of fairly conventional looking central plains style dagger axes have also been found in the region of Hong Kong, which shows just how far the influence of the events in the north had penetrated into the tribal southeast.



Southern weapons such as spears and swords were still preponderant but a gradual shift is perceivable. A longer style Chinese sword {'jian'} appears during the Eastern Zhou period which shows adaptation of familiar types of weapon, i.e infantry weapons, from the northern styles. The Yue people were still very culturally distinct to Chinese of the north during the Eastern Zhou period. The process of sinification of tribal people occurred through both direct conquest & assimilation with a more gradual cultural influence from the Zhou or Han civilisation on those beyond the direct frontiers. Within modern Guangdong province there are signs of the influence of northern styles amongst the southern Yue. Both weapons & motifs show some features derived from central plains culture, such as Western Zhou style surface decoration in abstract. A dagger-axe fragment in the British Museum from a site near Hong Kong was made in an early Eastern Zhou style (Rawson 1981). Similar fragments of what are clearly conventional dagger-axes are on display in the Hong Kong History Museum in Kowloon, as shown in figure 30.

Figure 30: Dagger-axe fragments from the Hong Kong region.

28) Jeffrey G. Barlow: Early Weapons Systems and Ethnic Identity in the Sino-Vietnamese Frontier. 1996.

29) Behzad Bavarian & Lisa Reiner: Piece Mold, Lost Wax & Composite Casting Techniques of the Chinese Bronze Age. 2006.



Figure 31: Ba-Shu style dagger-axe with Taotie mask.

An important feature of dagger-axes that were adopted by the tribal peoples on the south & south-western periphery of Zhou China is that while the blade shapes or some decoration might be visibly related to Shang & Zhou examples the extent & nature of their ornamentation was not. Weapons of the tribal peoples are often elaborately decorated in comparison with the common Chinese soldier's weapon which was produced from a feudal Lord's armory. Tribal folk, as the ancient Chinese noted, fought as individuals. This individual pursuit of glory or gain was at times was seen as a weakness of 'barbarians' due to their lack of cohesion and fickle nature in battle (Legge 1898). Amongst tribal warriors there is the desire to stand out from their peers & thus the weapons of these people carry ornamentation typically reserved for the elite amongst the Chinese armies. A tribal warrior had different motivations & perhaps lacked the discipline found within the ranks of soldiers comprising a Zhou army, but a tribesman's weapons reflect a more bold & individualistic version of warfare.

Dagger-axes of the archaic central plains style with elaborate surface decoration are found amongst the ancient Ba-Shu cultures of eastern Sichuan. The Ba & the Shu peoples were drawn into, or participated in, the struggles of the Eastern Zhou states, sometimes fighting with them or against them. By 316BC their lands had become vassals of the Qin. By 285BC were made a direct commandery (Cotterell 1981).

A group of unhafted dagger-axes buried in earthenware jars in Sichuan in the 4th century BC were isosceles shaped ge with perforations on the blade. We cannot however accuse any of these tribal so-called 'barbarians' as being backward for using an 'archaic' style of weapon. The south-western bronze cultures were highly developed artisans. Beautiful decoration is almost routine & the use of a surface layer of tin to add a silver pattern or texture to a surface is a notable technology. (Thote. 2001). In the south however it seems quite consistent that the forms of weapons owe their origins to weapons used many centuries earlier by the bronze cultures of the Shang & Zhou. For example it is typical for spears used amongst the southern cultures to use loops on the socket which is a feature of Shang-era spears. Within the Ba-Shu a hilt-less short bladed sword {'jian'} was used which copied a West Zhou type long since abandoned in the central plains (Rawson 1980.) Influences from the central plains Shang culture can be seen in Sichuan as early as the Sanxingdui culture. Early Shu culture sites which have weapons such as dagger-axes show clear signs of an influence from the central plains cultural sphere. (Yang 1992.) This would mean the influence of the central plains was felt much sooner in Sichuan than it was in the comparatively more distant Yunnan or Guangxi cultures of the late Bronze Age. The political independence of tribal Sichuan from the Zhou states was also eliminated sooner due to this proximity.



Figure 32: (left) Ba-Shu Dagger-axe with beast-face



Figure 33:

Ba-Shu dagger-axe with *hu*:

{blade extension}.

Tiger motif.

Eastern Zhou period.

There are certain problems with the dating of Ba-Shu material however. Sophia-Karin Psarras discusses how there is little to distinguish material of the 'Ba-Shu style' which is dated by Chinese archaeologists to the Western Zhou period to that is dated to the Warring States period. [30]

It is also possible that some Western Zhou attributes may have been revived during the Warring States by the Ba-Shu. So many archaic features are preserved by the Ba-Shu it stands to reason that close early contacts with the central plains by an indistinct 'proto-Ba-Shu' allowed for these to be preserved in Sichuan long after their demise in the place of origin. The nature of either revival or preservation is unclear, but the sheer number of archaic features in the dagger-axes, spear and short swords in Sichuan is hard to miss. The problem Psarras then raises is whether the presence of archaic style weapons in cultures further removed really means the influences date from the Western Zhou period, as conventionally believed, or whether the style of bronze weapons in the far south are simply West Zhou styles only much later adapted from Ba-Shu examples of the late Eastern Zhou period. This is certainly possible, but some attributes of weapons to the far south in Vietnam suggest that some part of this cultural exchange was during the earlier end of the spectrum, as not all features are present in the Ba-Shu. Certainly we can see that *ge* as a motif reached Sichuan in the late Shang period. I will return to the specifics of Vietnamese *ge* later.

While the Ba-Shu are discussed as a cultural type there are attributes specifically Ba or Shu which can be identified in particular. There are distinctions both in the weapon styles, symbols/iconography & a regionally distinct style of burial in wooden canoes which is most often associated with the Ba (Bavarian 2005) while shaft burials were employed by the Shu people (Rawson 1980). During the Warring states period, due to contacts with the Eastern Zhou military, a form of dagger-axe with a *hu* blade extension {figure 33} was employed which represents a more 'classic' style of Eastern Zhou period *ge*. Ba & Shu interactions with the central plains cultures is made clear by Taotie masks which occur on some blades and tiger heads in relief which was a popular Western Zhou motif (Rawson, 1980). The tiger is said had a special meaning to the Ba people and its inclusion may have been popular with them for this reason.

The archaic isosceles triangle *ge* was used up until the late Warring States period with one notable Ba-Shu feature being the extension of wings either side of the blade where it joins the *nei* (see figure 32). Both the type of archaic *ge* with perforations of the *yuan* & perforation on the *nei* were used by the Ba-Shu. The appearance of serrations on the blades of some late Warring States dagger-axes may also potentially have had an earlier precedent amongst Shu peoples. Weapons excavated within the central states dated to the late-Eastern Zhou include vicious looking serrations on some dagger-axes. The excavation of unique serrated bladed bronze *ge* at the much earlier site of Sanxingdui in Sichuan [31] means this feature appeared long before on the periphery.

The Ba-Shu peoples also share some traits with the cultures of north-west Yunnan & the Dian culture centred around Lake Dian.

The Shi Ji (historical records), written by the historian Sima Qian around 100BC, describes a diverse mix of peoples in the south-west of China. [32] The details of their customs, lifestyle, tunics & even hairstyles of the tribes subjugated by the armies of Han Wudi shows us that ancient Yunnan was no less diverse than the great mix of different minorities that still exist there today. The Yunnan cultures of the Northwest are not so well known or understood and cannot be directly connected with a historical people, as with the Dian Kingdom recorded by Han history. These people would broadly be considered to be "South-western Yi barbarians" by the Han. Due to lack of specific details the north-west Yunnan bronze cultures take modern archaeological names from the regions of their discovery: Wanjiaba & Dabona. These people again show unique cultural traits, such as burial in copper coffins, and used regional style weapons, such as 'trident guard' swords with a twisted cord hilt decor. The dagger-axe does not seem widely employed by either culture, but a few scant details indicate they again imitate the form of central plains weapons, broad with symmetrical edges, also that they resemble the dagger-axes found in early Dian tombs (Yang 1992). By this we can understand their weapons to be based on the archaic form such as used by Ba-Shu to the north and Dian to the south

30) Sophia-Karin Psarras: 'Rethinking the Non-Chinese Southwest'. Artibus Asiae Vol. 60 No. 1 2000

31) "Collected Chinese Bronzes" Vol. 13 (Ba Shu) .p. 34. III. 1986.

32) Francis Allard: 'Stirrings at the periphery: History, Archaeology, and the study of the Dian'. 1998.

The Dian culture in Yunnan was even more geographically distant from the influence of central plains China. For this reason Dian artifacts visibly share some features with the contemporary Dong Son culture of northern Vietnam (Allard. 1998.) and even some imports of designs from northern nomads, with steppes motifs conspicuous on Dian plaques. The Dian lived on a crossroads of many cultures. The distinctive form of certain broad based triangular bladed Dian swords shows influence from the Vietnamese bronze cultures while the adoption of a dagger-axe based on the early central plains style shows links to 'Chinese' bronze cultures, albeit perhaps via the Ba-Shu.



Figure 34: 2 'Dian culture' dagger-axes.



Figure 35: Tubular socketed Dian dagger-axe

Dian dagger-axe forms are quite varied and often have elaborate finely decorated surfaces. While their culture might be called 'Sino-Viet' their dagger-axes in particular show connection to China of the central plains. These include isosceles triangular bladed types, mainly narrow and including ge with in-turning blades (Figure 34). These typically have a perforated nei and sometimes a perforation on the blade in a style linked to a more ancient period of the central plains (Trubner 1959). A triangular type with slight flaring either side of the blade into a projecting pair of 'wings' also exists which is a variation on this first type & similar to the Ba-Shu figure 32. The ge usually has a broad based triangular blade which thins to a point, readily adopted perhaps since it loosely resembles the Sino-Viet type of triangular bronze sword blade. More unique within the region of south-west China is the Dian's use of a socket to attach to the pole, in the form of a slender bladed ge with a cylinder-like socket (Figure 35). Another remarkable socketed Dian ge is a type where the socket is formed around a realistic detail of a human hand, with the blade being sculpted as representing a broad dagger in the clenched bronze fist. A distinctive Dian type also uses a dagger-axe which does have a long *hu* blade extension, yet it has a very archaic feature in the manner of side projections such as used, & then abandoned by, the Western Zhou. These projections can be seen on the Dian ge figure 36 and suggest a link to West Zhou type ge, figure 29. All these Dian weapons are typically ornamented, often with spirals, geometric curvilinear art, lively depictions of animals of all types and representations of mountains, clouds and water in abstract patterns. Perforations on a ge blade are used to effect in the Dian-art, being surrounded by radiating lines, extra rings, or other details that can be worked into a panel. Water buffalo, snakes, birds, rabbits, fish, frogs all appear on Dian weapons. For example the tubular socketed ge (figure 35) has 2 otters facing a fish. The common depictions of clouds, land, mountains & water as bands on Dian axes uses a tight spiral form to represent clouds. In contemporary Han art curvilinear spirals & swirling and softer 'cloud forms' were fashionable on bronze but do not appear directly related. Another feature of the Dian which appears outside the Dian cultural area, perhaps implying a broader 'Indo-Chinese' style (Trubner 1959) is the depiction of strange "grotesque" beings on the nei of some dagger-axes. There is no consensus over what these represent, animals, men, or supernatural beings. One example can be seen on the blade of figure 37.

Ge with such shared motifs occur both within Dian sites of Yunnan & Vietnamese sites. In Vietnamese contexts such halberds are sometimes called 'qua'. While elements of culture might be shared some ge appears to be actual trade items made by the Dian which were then dispersed. The decoration and form of ge from Lijiashan & a 'qua' excavated from Hoa-Binh are a true match. The shape is the archaic triangular ge, strange beings decorate a panel on the nei and a disc of radiating lines surrounds a non-functional hole in the blade.

While some ge might then be called 'Dian' in style there are also unique Vietnamese versions of ge. In these ways the dagger-axe which originated within ancient China had clearly penetrated beyond the frontiers into south-east Asia. Bronze halberds have been excavated both in Vietnam & northern Thailand. The Dian culture in particular is the likely conduit for this exchange as Yunnan had a very ancient indirect connection to the central plains of China.

Dagger-axes that occur within Vietnam occur in varieties and contexts that show they had a function as status symbols. Ornate & even unwieldy versions were the possessions of the same elite who controlled trade routes and had indirect contacts with far distant peoples. The use of Chinese weapons by figures of tribal authority is well illustrated by a BaiYue rock painting of what appears to be a shaman figure (Barlow. 1996). The central figure wields a distinct type of Han-Chinese ring pommelled *dao* (a sabre) with a second sword at the hip. It appears then that northern weapons could be possessed by figures of tribal authority, and that by extension those weapons might be symbols of authority. Of dagger-axes found in chiefly graves in south Vietnam there are both light weapons with no signs of sharpening, or preparation for use, which are seen as ceremonial while other dagger-axes are more robust and have a functional blade [33].

33) Nitta Eiji: 'Heger I Drums, Bronze Halberds and Ranked Societies in the Mekong Basin. 2005.

In physical form Vietnamese dagger-axes tend to have an archaic style, although the surface decoration and precise shapes are locally unique. Apart from geometric designs there are depictions of animals such as elephants, birds and great cats. The isosceles triangle archaic-style of dagger-axe is found inside Vietnam along with more conventional dagger-axes with *hu* blade extensions. These are local interpretations of the form of Chinese *ge*, for example Vietnamese 'qua' of Dong Nai Province have a very short *nei* [34]. On Vietnamese *qua* the *nei* (rearwards tang) often lacks a perforation for binding. Certain immense versions of *qua* make a striking visual impact yet the dimensions and blades seem impractical. This larger type of *qua* with an inturned blade can have total lengths of 60cm. Such fearsome looking objects display the side projecting wings of the much earlier Western Zhou style. One example in this larger style can be seen in Figure 39. Side projecting wings are pervasive on Vietnamese *qua*, on both triangular and *hu*-bladed *ge*. Many of the Vietnamese style halberds display certain features that were obsolete in the central plains at the same time but which persisted in the tribal southwest & southeast. A very distinct Western Zhou style of blade which also occurs inside Vietnam is the mixed *dadao*-*ge* with a heavy style blade (similar to Figure 24). Since I haven't found an example of this blade type within Dian culture sites or the Ba-Shu culture this infers a persistence of these West Zhou *ge* styles which came from an earlier & quite different diffusion into Vietnam.

The Chinese inspired dagger-axe lingered on much later in Vietnam than it did inside China itself. Bronze halberds still fulfilled a cultural use in Vietnam, and were buried with chiefs up until the 2nd century AD (Eiji. 2005) while bronze weapons had long since vanished in China. This is a terminal date for a dagger-axe form but does not answer just when the *ge* weapon was first adopted in the region. My own feeling is that while the dating is unclear at present the appearance suggests an inspiration based on fairly pure ancient styles. Either these styles were revived by an unknown mechanism, or some cultural site awaits discovery which was a more tangible link between the early Bronze Age Western Zhou & these Bronze Age/early Iron Age cultures to the far south.

While Sophia-Karin Psarras raises many important issues over conventional dating of archaeological sites in China and outlines dubious chronologies constructed by archaeologists I do not agree that the form of Vietnamese *ge*, as perceived by Psarras, obviates a hypothesis of early transition into Vietnam. As I outlined one style of Vietnamese *ge* is of an archaic form which appears was not used by either the Dian or the Ba-Shu. Either this was an independent invention, or it was an earlier movement, or a quite separate revival of a West Zhou form. It is not however likely to be related to a Ba-Shu influence. The prominent use of the archaic and obsolete feature of side projecting wings in Vietnamese (and to lesser extent Dian) versions of *ge* is also not something that seems to have been preserved amongst the Ba-Shu either. Where Psarras sees evidence in the form of some Vietnamese *ge* with an upwards arched blade that the inspiration for Vietnamese types was from a late Warring States *ge*, or Qin type (Psarras 2000), I see very little. The angle of some blades is a minor point compared to the great many archaic and obsolete features to be seen in a sample of Vietnamese forms, some of which were not apparently able to have been transmitted by the Ba-Shu. If there was knowledge of later conventional forms of dagger-axes, as used by the Warring States, it does not preclude the possibility that there was more than one time that forms were diffused to the south. Another issue is that the Ba-Shu were already destroyed at the time which Psarras assigns to Dian culture sites in a revised chronology of 122BC-174AD (Psarras 2000). Any hypothesis still then requires an undefined intermediary, who awaits discovery. The same requirement could be said of a hypothetical earlier transmission before the Warring States era. As demonstrated by the studies of lead isotopes in Shang era bronze there was certainly some means for indirect contact long before either the Ba-Shu or the Dian emerged as a culture, as Psarras is of course well aware, "...Communication between China (in the modern geographical sense) and Southeast Asia was not initiated by Han political expansion to the northern coast of Vietnam, but is attested as early as the Late Shang (circa 1200-1050 B.C.)" (Psarras 2000).

Unfortunately the very questionable dating of both important sites in southwestern China & within Vietnam means a precise chronology or pattern by which the *ge* did travel so far south is not forthcoming.

I will now make a return to weapons that belong to those south-eastern tribes broadly called 'Yue'. The Yue people were said in Han histories (like the *Hanshu*) to have lived in the large area from modern Zhejiang province to Guanxi province in the south. These people, the *BaiYue* or *NanYue* {meaning hundred Yue or Southern Yue} were very different from the Chinese of the central plains. Material differences with the north can be traced back even to the Neolithic period. The Hemudu culture of Zhejiang province were already residing in stilt houses in the 5th millennium BC, a style of raised dwelling that continued even into the late Bronze Age in Yue areas.

The Yue were recorded in Chinese histories as a very different people, archetypal barbarians who cut their hair short, tattooed their bodies, wore garments made from plant fibres and lived in villages rather than the urban centres as the Chinese were then accustomed to. [35]

A very different Yue polity along the eastern coast and sharing a direct frontier with Zhou China is referred to as the "northern Yue" by Chinese scholars in effort to distinguish them from the mega-Yue culture of the south (Barlow 1996.) The particular Yue people of Zhejiang were ruled by series of kings and entered in a mortal struggle with Wu state in the late Spring & Autumn period. They thereby give their name to a de-facto 'state' of the Eastern Zhou period: Yue state. These were not Huaxia Chinese, and would normally have been tersely recorded in Chinese history as such historians saw fit but these Yue justified more attention by virtue of their conquering Wu state in 473BC. Yue state then suffered a decline at the hands of Chu state after 334BC (Cotterell 1981). The ancient written record known as the bamboo annals refers to the people of this notable political grouping as *YuYue* [36] and so to prevent confusion with the broader concept of 'Yue' I will refer to these historical people of the de-facto state specifically as the *YuYue*.

34) Ha Dinh Nguyen : 'Bronze antiquary'. Thanh Nien News, 2008

35) Heather Peters: 'Tattooed Faces and Stilt Houses: Who Were the Ancient Yue?' 1990.

36) Eric Henry: 'The Submerged History of the Yue'. 2007.



Figure 36: Dian ge with side projections, top left.

Figure 37: Dian ge, left.
(with enhanced detail of same ge shown above at right.)

Figure 38 Vietnamese Ge.
32cm long with very short nei. Thin and roughly cast this is 'mingqi' (a grave object)

Figure 39: Large Vietnamese Ge.



From the time of the initial YuYue contest with Wu through to the line of kings who ruled after Wu's destruction it appears the Yue 'states' people were ruled by an elite who were seeking the trapping of Zhou nobility and crafted weapons of notable quality and beauty.

As a sign of transition, but still linked to their tribal origins, one Yue king whose tomb was excavated in Shaoxing during 1998 had a tomb mound which at the centre had the occupant buried in a coffin fashioned like a dugout canoe. A bronze sceptre from the same tomb, probably the tomb of Goujian's father (Henry 2007), depicts a figure that has a heavily tattooed body. While this is surely somebody who might be considered a barbarian there were already swords of exquisite beauty being fashioned at this time and signs that the YuYue bronze artisans could rival those of the Zhou states.

Of the Yue beyond the immediate frontier however there is less evidence of any sinification or technical revolution at this time. Very few bronze weapons have been excavated in the area of modern Fujian (the ancient Min-Yue peoples) but these show a quite crude form of dagger-axe. The hatchet-form of blade, *qi*, such as used by the Erlitou culture exists alongside primitive *ge* consisting of a simple blade with a large *nei* and no *hu*. The dating for these Fujian weapons is uncertain but should be no later than the Spring & Autumn period (Yang 1992). The contrast between the Yue people who successfully contested with a Zhou state & their more isolated brethren to the south in Fujian then displays a difference in proximity & the wilful adoption of a culturally 'Chinese' or central plains style culture by the YuYue. On this point of contrasting 'Zhou' & 'tribal' assemblages there is one other aspect to consider that repeats itself across the ancient Chinese period, *cultural transition and assimilation*. Along the ancient Zhou frontier of Wu & Yue the sinification of the Yue-state peoples (*YuYue*) in the early Warring State period can be seen if we ponder their weapons, notably swords and dagger-axes. Both Wu & Yue deserve special mention for the use of inscriptions on conventional Zhou-style weapons. It seems that the YuYue actively sought to compete with Wu state in every way, militarily and culturally, and in the aftermath of victory sought to be their equals according to Zhou standards. Inscriptions on weapons attributed to Wu-state nobility which exist are matched by surprising numbers of weapons inscribed with the names of Yue kings, a people the histories would tell us were essentially barbarians. It should be noted the names of King's or nobles on any weapons have routinely been interpreted as meaning 'personal' weapons. However given the quantities of such weapons that have turned up, and many far from home in the case of Wu/Yue kings weapons, it seems likely that some inscriptions at least were for the purposes of recording authority over production or right of ownership in a broader sense. This may be personal use {'*zi zou yong*'} in the broad sense of the king's authority, used/presented in the king's name. In the same manner we find the symbol of the crown and dates of manufacture on British weapons of the 19th century, and every vessel in the Royal Navy might be prefixed by H.M.S {His/Her Majesties Ship} but this does not mean the sovereign carried that rifle or must be at the helm of that ship! Yue weapons with specific kings names on them exist alongside others with brief inscriptions that are no more the "Yue King's dagger-axe" {*Yue wang ge*}. This may be a precedent of the use of mundane inscriptions to track weapons production and authority, such as was developed and then taken to great detail by the Qin industrial bureaucracy.

Wu state in contrast to the YuYue had the privilege of only being regarded "semi-barbarian" by the central states (Buckley Ebrey 1996.) According the ancient Zuozhuan text the founders of Wu state were said to have been Zhou princes who settled amongst natives and cut their hair short and tattooed their bodies, yet the YuYue did not even have the benefit of this, possibly apocryphal, lineage for any legitimacy amongst the feudal Zhou. This also suggests why the precise names of Yue kings written on weapons are fertile ground for scholarly debate. The script is likely an approximation of a non-Zhou language. The use of very different languages by 'barbarian' tribal people during the Zhou period is recorded in one contemporary Spring & Autumn anecdote. A chief of a Jiang Rong {a barbarian tribe} was about to be seized while attending a conference between Jin & Wu state, & says in an eloquent & successful defence:

"Our food, our drink, and our clothes are all different from those of the Flowery States; we do not exchange silks or other articles of introduction with their courts; their language and ours do not admit of intercourse between us and them. -what evil is it possible for us to have done?" (Legge 1898)

Whatever the nature of the Yue language that weapons were inscribed with, we can appreciate that the YuYue made extremely fine weapons in the Zhou-Chinese style. Examples of YuYue dagger-axes are normally well executed & conventional *ge*, with appearance & proportions that are comparable to those made by Zhou states at the time (such as the Wu & Chu *ge* figures 40-41). At the Shaoxing museum in Zhejiang province there is one YuYue *ge* of unusual type, which is socketed & ornamented in a manner more fitting of the steppe culture. More typically YuYue *ge* have *hu* blade extensions, a perforated *nei*, and several holes for binding in the standard Chinese fashion.

From Yue King Goujians' conquest of Wu in 473BC to as late as 334BC such trappings of the Zhou may have had a political significance. Even in the time of King Goujian, notwithstanding the obvious fictionalisation of the *WuYue Chunqiu* narrative 700 years later, the state of Wu was Yue's most likely filter for Zhou culture. This sparked a contest along military, cultural and technological fronts. The adversarial relationship later gave rise to the mystique of the region for especially fine weapons such as swords. A fame which lasted much longer than the actual existence of either state. Han period fictionalisation of the *WuYue* conflict with magical blades can be compared to the fables of King Arthur & his sword Excalibur, which also had a potential kernel of truth in Romano-British resistance to the Saxons.

More concrete evidence of a real process of transformation towards Zhou styles comes from the early Warring State period graves of Yue nobles excavated at Xishan, containing musical instruments both of Zhou & Yue types. The YuYue had come a uniquely long way from their tribal brethren & namesake. Wu could be seen as distant cousins seeking legitimacy as a contending Zhou state, the YuYue people instead were a tribal kingdom, outsiders on the frontier independently adopting Chinese ways. Their much celebrated weapons are therefore paradoxically absent of any trace of traditional "Yue" form or motif.

For southern Zhou states like Chu or Wu the quest for legitimacy in the feudal system, or potentially ascendancy over the scornful central states, was a matter of great concern.



Figure 40: Left: Spring & Autumn Chu state dagger axes, inscribed with the name of a Chu king, Xichuan.

Figure 41: Below: Spring & Autumn Wu state dagger axe with inscription. Found in Shaanxi with inscription attributed to King Liao of Wu.



Chu is another ancient frontier state and is credited with introducing Zhou influences into Sichuan (Rawson 1981) as well as the Southern Yue of Guanxi (Barlow 1996.) & the Dian peoples of Yunnan (Allard 1998.) The contemptuous remarks the central states citizens sometimes expressed of states like Chu (and Qin) with regards to their origins are partly understood via archaeology in Chu, with regional attributes that are specific to 'Chu' culture. For example, a Chu tradition of a chambered shaft-style burial is identified as being a regional tradition that influenced even Han-period tombs within the area of that former state, such as at Mawangdui, northerners instead favoured a tumulus with surrounding pits (Debaine-Francfort 1998). Xiang Yu, a Chu aristocrat of the late 3rd century BC, & a contender for the Qin Empire, is recorded in the *Shi Ji* as having killed one of his officers for making a remark about Chu peoples being "monkeys with hats on". This bias likely comes from the fact the ancient histories suggest Chu state was founded within the lands of Yi barbarians by a Zhou noble, and later the nobility claimed themselves to be "Manyi" {barbarians}. Although there are religious differences alluded to in Han history and modern archaeology the Chu rulers still had the trappings of the civilised Zhou.

Given the might of Chu and its geographical extent during the Warring States period it deserves credit as a conduit of Zhou culture, being very sophisticated regardless of any differences with Zhou styles. [37] Cultural exchange with the Bai Yue is also revealed by a distinctly Yue-style axe found in within a Chu tomb in Changsha (Yang 1992.). The qualification over this is however in the contrast with Bai-Yue weapons assemblages discussed earlier and the prominent use of dagger-axes by Chu. In published statistics of 1,244 "pre-Han" Chu graves (minor & smaller burials than tombs) there were no bronze axes found while 137 dagger-axes were excavated [38]. This provides a cultural contrast to the weapons favoured by the Bai-Yue in excavations where nearly 5 bronze axes were found for every dagger-axe.

As has often been suggested, swords were important weapons for the southern Zhou states like Chu, 394 bronze swords were uncovered. Other notable weapons are 1 iron 'ji' halberd head & 7 bronze halberd heads. 65 spears were also uncovered, so potentially 2 piece ji are not included in a total. In summary 31% of minor graves contained bronze swords & the next highest total was 11% of graves containing dagger-axes.

While mentioning the distinct forms of dagger-axes & mix of cultures along the southern frontiers of ancient China it is worth examining the distinct dagger-axe styles that also existed along the *northern cultural zone*.

The earliest copperwares in the northern cultural zone belong to the Qijia culture & included a socketed type of axe. The use of a socket was persistent in the northern frontier of ancient China throughout the Bronze Age. Tubular socketed & oval bladed axes were used within the Northern Cultural Zone during the Shang period (Loehr 1956), a distinct feature quite unlike those associated with the central plains. Given the consistent direction along which dagger-axes evolved during the Shang-Zhou period it can be surmised that the finds of socketed weapons in the northernmost regions of the Chinese cultural sphere, & inclusion in Huaxia tomb assemblages, are as a result of influences from the steppes/northern zone. Socketed axes found around Beijing and Liaoning for example resemble those of the Karasuk culture of Siberia (Rawson 1980). In turn the presence of artifacts of 'central plains' style within steppes culture sites shows this pattern of influence and material exchange was mutual.

37) John S. Major, Constance A. Cook: 'Defining Chu: Image and Reality in Ancient China' 1999

38) Donald Wagner: 'The Dating of the Chu graves of Changsha'. Acta Orientalia. 1987. 48. 111-156.



Figure 42: Northern frontier socketed ge, Western Zhou.

Figure 42 is a very early style of weapon, from the area of the state of Yan, and dated Western Zhou, so fits within the northern frontier context. It has been suggested that the steppes cultures of the northern cultural complex appear to be influenced by the Chinese sphere of metallurgy [39] in that bronze weapons were used quite late in history and there is evidence for cast iron products. The steppes peoples of this region in turn appear to have influenced a belated appreciation of golden objects in China, who traditionally exalted jade & bronze foremost [40]. The steppe is also the source of zoomorphic iconography which was then incorporated into artefacts of Chinese manufacture. This mutual exchange may make exact origins of some weapons & some styles unclear, as in where & amongst whom they first arose, but their shared use is clear (Rawson 1980.). Tubular sockets in particular, due to their preponderance in the north, suggest a presence within Chinese contexts is likely down to a particular regional influence, i.e: the steppes cultures. One type of finely made East Zhou ge, of which I know of 4 similar examples along this animal combat theme, is attributed to influence of the 'steppes grasslands culture' (Cheng & Zhong 1990.). This is due to the use of a socket for attachment, and the typical steppes motif of animals in combat (often predator & prey): ge like figure 43 often depict a great cat grasping a bird of prey.

The depiction of animals or mythical beasts locked combat is an artistic feature which had its origins amongst the Scythians, and even forms a type of marker for the emergence of mounted nomadic society within the artefactual 'Scythian Triad' (Di Cosmo 2002). The appearance of this style in China, called the "Ordos Style", lies in 'zoomorphic plaques'. Scythians material culture influenced many steppes peoples from the Balkans to Manchuria. The use of animal iconography understandably reflects the pastoralist nomadic preoccupation with animals in their steppe environment. The nomads also lived in a very testing environment in which the harsh struggle of life was especially clear. This Scythian-influenced style is even found in the easternmost extent of the Eurasian steppe within Korea: [41]



Figure 43: Steppes influenced ge.



Figure 44: Miniature Ge such as found within the Ordos region. 9cm in length

The nomadic 'Hu' 胡 of the 4th century BC and later the Xiongnu 匈奴 in particular show clear signs of their cultures being a Scyth-Siberian branch of such steppes cultures. [42] Some older names of northern barbarians vanish (as likely did the peoples themselves) as Zhou states consolidated. These Scythians motifs appear in China during the Eastern Zhou period at the time Chinese history starts to mention a people called the 'Hu' in the north. As the northern Zhou states drove north in wars of conquest they drove barbarian people away and shared the land with others. By this mechanism the world of the Zhou and the Hu nomads closed in on one another (Di Cosmo 2002).

39) Karl Jettmar: 'Metallurgy in the Early Steppes'. *Artibus Asiae*, Vol. 33, No. ½ 1971.

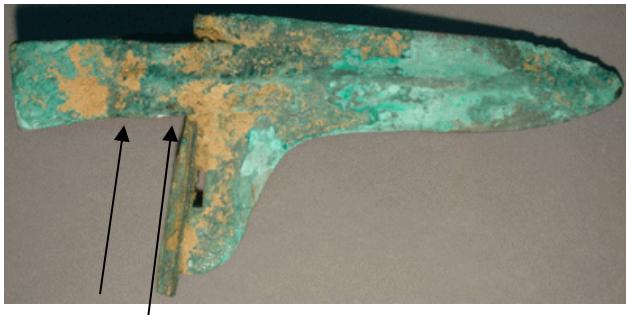
40) Carol Michaelson: 'The First Emperor. China's Terracotta Army. 2007.

41) Moon-Ja Kim: 'A study on the Scythian buckle' *Journal of Fashion Business*. Vol. 10. No. 6 2006

42) Sergey Minyaev: 'The origins of the 'geometric style' in Hsiungnu Art' 2001.

One example of this cultural mix is within a ‘non-Zhou’ state such as Zhongshan in the north (founded by Di barbarians). In the tomb of king Cuo a bronze artefact depicts a tiger devouring a deer (So & Thorpe 1993.) The object has beautiful inlay, a highly developed craft of the central plains artisans, while the motif is quite conventionally steppes in origin. In this way both culturally and ethnically the northern Zhou states & peoples of the frontier show signs of their shared influences. The adoption of ‘Hu’ dress by the Zhao states cavalry is an important example I will discuss later.

The influence of more purely ‘Chinese’ forms of weapon on steppes people is shown by the use of archaic style dagger-axes in the Ordos region along the northern frontier of ancient China. Miniaturised archaic ge based on the isosceles triangle type were used burial objects in the Zhou period, possibly being associated with the burial of children (Jettmar 1971) These are a tanged (‘Chinese style’) dagger-axe, possibly an exotic object amongst such peoples just as the socketed weapon was exotic in the central plains. See figure 44. A full size version of a tanged ge from the Ordos (with a *nei* & perforations for binding) is shown alongside these in Jettmar’s paper. It has a fairly squat form with a short *hu*. The blade is so short I suspect it may have been salvaged from a broken ge & resharpened as the *nei* is almost as long as the *yuan*. The perforation on the *nei* suggests an East Zhou dating, so we have either a salvaged Chinese *ge* or a pretty crude approximation of one. One East Zhou steppes style of *ge* was based on an obsolete Shang style, with a socketed *nei* & a simple *hu*. The socketed *nei* can have animal motifs (Cheng & Zhong 1990) and figure 45 represents their style. The dating of figure 45 is uncertain but it illustrates a socket as was used in the steppe. Dagger-axes such as found on the northern frontier, including some in association with bronze helmets, would include the trapping of earlier northern barbarians like Rong & Di tribes since there is less evidence these *ge* or bronze helmets were used by the Xiongnu [43]. The word ‘Rong’ is even comprised of a *ge* associated with a shield: (Xie 2003).

 “戎” {Rong}

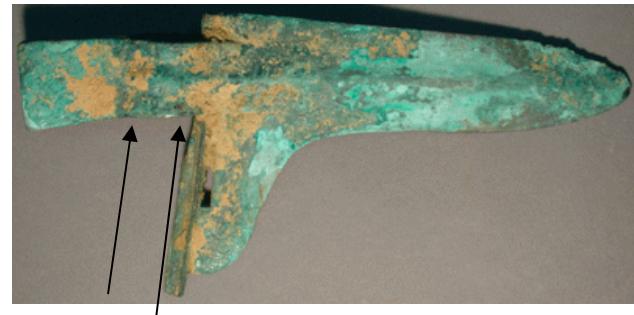


Figure 45: Socketed style of *ge* such as used in the Northern Cultural Zone.

There were many tribes of ‘barbarians’ who contested with the bronze cultures of the central plains as they expanded northwards, and many came off second best before the arrival of the Hu barbarians on the historical and archaeological record. Features of early Hu nomad sites instead are more associated with Scythian style objects, 3 winged arrows, plaques, golden objects & and pick axes (Di Cosmo 2002). The weapons called pick-axes are also called ‘crane-bill battle-axes’ and occur alongside typical nomad weapon like shortswords. Of two sites attributed to Xiongnu that contained a dagger-axe with a shortsword it is mentioned that these had ‘a straight upper-edge’ (Psarras 2003) which would likely imply an archaic style *ge*, in contrast to the arched style *ge*. Given the timing of the arrival of fully nomadic peoples north of China (early Warring States period) & their distinctive style of warfare, it stands to reason the influence of the *ge* on such nomads would be limited. Xiongnu sites yield Chinese coins and bronze mirrors that show a material exchange between spheres occurred but their weapons types seem related to their own martial tradition.

The historical ‘Shan Rong’ of the Warring States period or the later ‘Dong Hu’ seems to refer to the Tungus or Liaoning peoples who existed along the east of the northern frontier. General patterns of influence between ancient China and the peripheral bronze cultures can also be seen in the transition of weapons in graves within the steppe here. Once Chinese-style dagger-axes are found in excavated sites it concurs with a change to the swords of this region, attributed to the influence of straight edged and slender swords of the East Zhou type. The depiction of animals on the *nei* of a dagger-axe still links the people to the artistic traditions of the steppe (Yang 1992). As a result of the late Warring States-era expansion of Yan state northwards the “Liaoning bronze sword culture”, named for distinctive mandolin-shaped blades, displays a material change. Iron was introduced & objects found in graves give way to assemblages that include Chinese style dagger-axes [44]. This is also a reflection of the pattern which occurred slightly later in Yunnan, where Dian culture graves after Han expansion begin to include Chinese style weapons (long iron swords) and by the beginning of the East Han distinctive local forms of Sino-Viet style no longer occur.

Non-Zhou peoples initially resided inside the long walls of Yan, and a synthesis of the original culture occurred as well as a ripple effect beyond the stockades. Yan state currency is found as far afield as Korea.

This pattern of expansion, assimilation and conquest continued for centuries.

The manner in which barbarians were regarded by the Shang & Zhou is suggested by the original script used to write names like Yi & Qiang. Early pictographic names of these peoples depicted captive figures bound by rope around their necks or bodies. This can still be seen in the modern written form of Yi:

夷

43) Sophia-Karin Psarras: ‘Han and Xiongnu: a re-examination of cultural and political relations. *Monumenta Serica* 51. 2003.

44) Lee Chung-Kyu: ‘The Bronze Dagger Culture of Liaoning Province and the Korean Peninsula’. *Korea journal* Vol.36 No.4 1996

Tensions still simmered after the Zhou era. West Han Imperial biographies list rebellions by the southwestern Yi, northwestern Di, Northeastern Wu-Huan and Western Qiang tribes which all required military mobilisation to put them down. The Min-Yue in Fujian had a semi-independent status. The NanYue king successfully rebelled against the Han within Yue lands until Emperor Wendi brokered a peace. The Empire itself was never seriously imperiled by regional troubles. Many of the original tribes mentioned by the Zhou appear to have been displaced or assimilated by this time.

One exception to the sustainable situation inherited by the Han Empire was the formidable Xiongnu, a Hu nomad people that came to dominate the steppe contemporaneously to the rise of the Han. Later each competed for influence in central Asia. Records of massive raids inside the frontier & kidnapping of Han Chinese by these nomads are recorded in the biographies of Western Han Emperors spanning several generations. I will elaborate more on the Xiongnu threat when I discuss halberds of the Han period along with the reorganisation of the Han military which was required to face a rival steppe empire.

The Eastern Zhou period battlefield.

During the Eastern Zhou period, from the 8th century BC to the 3rd century BC, Chinese warriors battled using massed chariots & infantry, and then later adopted cavalry forces, as their feudal kingdoms became increasingly involved in open & cataclysmic military conflict. In the early Eastern Zhou period chariot based armies were still prominent in battle as noble warriors (*shi*) went to war accompanied by supporting infantry. Warfare was conducted between related members within a feudal system, and the conduct of such warfare was in theory regulated.

While the rules of war were not always heeded in the Spring & Autumn period it can be said that they were at least recognized to exist. Initially the various states were supposed to acknowledge the authority of the Zhou king. Later in the Spring & Autumn period a hegemon was elected from amongst the various dukes who then had the prerogative to enforce peace, later still dukes began to call themselves kings in their own right. Via this we can see a steady erosion of the Zhou system, as James Legge opines of Zhou feudalism: "*this beautiful theory of government presupposed a wonderful freedom from jealousy and ambition on the part of the feudal lords {Dukes}, and an overwhelming superiority of force on the part of the {Zhou} king; and, neither of these things existing, the constitution of the kingdom was torn into shreds.*" (Legge 1898). The way in which a general or a noble warrior conducted themselves on the battlefield was seen as a reflection of their virtue and bearing. The chivalrous manner in which warfare might be conducted between Eastern Zhou armies resulted in historical accounts of extreme courtesy to an opponent which contrasts rather starkly with reputation of Warring States period conflict. (Jian 2001). When Zhou armies faced barbarians however no rules of war or base conduct ever applied. In this way the more central states were disadvantaged in relation to outer states like Yan, Zhao, Qin, Chu, etc. who could use non-Zhou tribes as temporary allies, or resources by seizing & occupying their lands and populations. While the Spring & Autumn cannot be said to have been lacking in wars, the wars were of limited scale compared to what followed. Cavalry forces made an appearance alongside massive infantry formations during the later stage of the Eastern Zhou period (the Warring States period). The numbers of warriors in armies grew to previously unheard of figures as the number of states dwindled and resources were expanded proportionately by conquerors (Ebrey 1996). During the early Eastern Zhou period such armies were not of the huge sizes that would appear later, and so chariots still played a notable role: A large inter-state battle in 589BC is recorded as having 800 chariots & 12,000 supporting infantry involved (Rawson 1980.) The character of war changed as the numbers of competitors dwindled. Massive infantry armies grew & huge numbers of weapons were also produced. Just as they are shown to influence written Chinese characters, even metaphors for an ancient army drew on the image of the ge & ji being wielded by soldiers: "*The halberd holding masses*" or "*Ten thousand long halberds*" [45].

The basic form used in the East Zhou appears at the end of the Western Zhou period (Figure 46). The tip of the blade on these ge was typically triangular pointed, and this was the style then passed onto the Spring & Autumn period. The swept-back side projections that extend over the shaft of figure 46 and the riser on the blade are both Western Zhou innovations. The projections here represent a creature like a tiger, but as a practical design feature this addition was destined to die out. One published triangular tipped dagger-axe (attributed to the Duke of Jin) is of a typical late West Zhou style, it has 3 perforations along the hu & one on the nei. It also had a 19 character inscription on the nei stating it was made in 837BC for a *yong* chariot ceremony, a ceremony which used "chariots ge 300" in the event.

Poles for mounting ge during the Spring & Autumn period were typically much longer than previously used and reached 3-4 metres long. This was required for chariot crews to fight while mounted, or for infantry to engage enemy chariots. Chariots remained in use on the battlefield throughout the Eastern Zhou period although their influence started to wane as the nature of war and the terrain it was conducted on began to change. The limited application of chariots is shown in a previously mentioned Spring & Autumn account where an officer refusing to fight on foot had to be executed, and this then be made known to the army. In that instance the chariot was superfluous to the commanders' tactics:

From the Zuozhuan:..."*{The barbarians} are all footmen, while our force consists of chariots. We must meet them, moreover, in a narrow pass. Let us substitute ten men for each chariot, and we shall overcome them*". After an example made of the recalcitrant officer, the general deployed his men as foot-soldiers to meet the barbarians of the Wuzhong and Di tribes, "...Accordingly, he put aside his chariots, and formed the men into ranks, five chariots furnishing three ranks of five men each...." (Legge 1898).

There is historical evidence for the appearance of mounted cavalry archers after 4th century BC, attributed to the military reforms of the state of Zhao; however not until the Han period were cavalry to fully replace chariot forces. At the beginning of the Western Han period Chinese armies were still a mix of infantry and chariots/cavalry. A serious difficulty for the Han Empire during its wars with the Xiongnu Empire was supplying enough reserve mounts to conduct a truly mobile form of cavalry warfare across steppe terrain, and sustain losses of horses during harsh campaigns (Di Cosmo 2002).

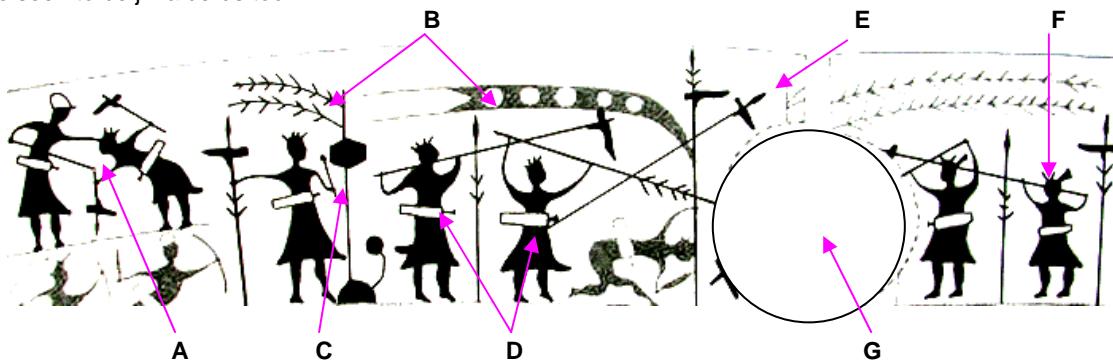
45) Zou Zongxu: 'The Land within the Passes: A history of Xian' 1991.



Figure 46: Late West Zhou period ge

During the late Eastern Zhou period infantry stilled formed the largest branch of an army. Light cavalry had a supporting role. At the battle of Changping in 260BC Qin cavalry are recorded as harassing & aiding in cutting off a Zhao army from its supplies after it had been drawn out in pursuit of a feigned Qin retreat. Given that Zhao first adopted cavalry and must have been familiar with a steppes tactic like *feigned retreat* this is irony indeed. A general called Zhao Kuo is said to have fallen for this ruse, and then the enormous surrendered Zhao army to have been executed en-mass as a way to ensure their soldiers would never fight again. Zhao's ability to resist Qin state was crushed in one awful action. This is an example of how low conduct had spiraled under the total war ethos.

Based on contemporary Eastern Zhou art and archaeology, ancient Chinese warriors could be compared to European pikemen for the length of their longest polearms. Shorter versions of dagger-axes on poles closer to 1.5m appear alongside these longest types. Each had its own specialty in function. Short hafted ge would be for infantry close combat, as were the original short hafted ge, while longer poles could drag down horsemen, engage chariot crews or attempt to disrupt tight ordered formations before entering closer melee. Clear examples portraying the 'combination' type ge, with spears, hooks and extra fittings can be seen on a recurring style of Eastern Zhou bronze with battle scenes. The ji halberd arrangement is common on long polearms below. The shorter pole mounted dagger axes seem to require only the puncturing point to be effective, and could be wielded with a shield. A shorter pole would allow for swifter puncturing strikes and more conventional close melee within grappling range while the longer poles act as specific tools and engage over a distance. Spears mounted above dagger axes can clearly be seen in a scene taken from an Eastern Zhou period bronze mirror, and some of these shorter types of weapon can also be seen to be ji halberds too.



There are several points about this battle scene, variation of which repeat on Eastern Zhou bronzes:

A: Warriors seize each other by the hair, each having a convenient top-knot. Huaxia Chinese defined themselves as a people who wore their hair atop their heads, unlike barbarians. This situation repeats in such battle scenes & can include a warrior delivering a coup-de-grace to a restrained opponent. The Qin terracotta warriors give evidence of just how complex these hairstyles could be.

B: Streamers and banners/pennants are seen attached to both chariots & long poles in ancient art, with tassels apparently depicted on several ge here.

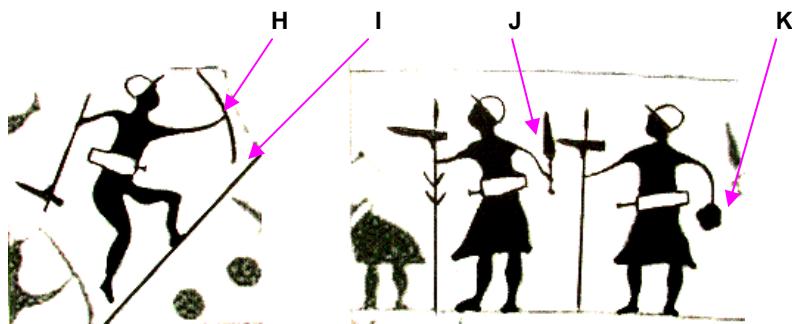
C: Drums were used for battlefield communication. Drums signaled advance and bells signaled retreat. 1 drumbeat signaled march, 2 signaled attack. A bell struck meant cease fighting & 2 strikes meant retreat. (So & Thorp 1993). An ancient phrase "blood for the drums" also hints at a part to play in the post-battle execution and sacrifice of important captives (Cotterell 1981).

D: Short swords are shown in scabbards on the hips of every warrior, an important close combat & self defense weapon, especially for long pole-armed warriors who found themselves in a tight crush of melee. Eastern Zhou swords (bronze 'jian' 劍) were double edged thrusting weapons, typically no longer than 50cm in length and ideal inside a grapple.

E: The longest polearms are often ji halberds, as can be seen to have a spear mounted atop. The method of wielding these overhead above the shoulders may have suited fighting in formation, such as Greek hoplites used a high strike with a spear while inside a phalanx, as this was less restrictive. With a ge a point delivered downwards and using the hooking inside edge of the ge may have been a way to engage by hooking and controlling an enemy weapon.

F: The warriors facing each other display different hair styles. Regional differences according to culture & fashion would have been visible in opposing Zhou armies. It has been suggested that varieties amongst the Qin terracotta warriors perhaps reflect the use soldiers from different populations of the former Warring States.

G: Is an area with no panel detail. This is likely the rear dome of the bronze mirror. The scene is extracted from the bronze mirror detail in Cheng Dong & Zhong Shao-Yi's text.



Above we see the use of a short pole-mounted dagger-axe by a warrior advancing behind his shield (**H**). He is wielding the weapon one-handed in the manner of a battle-axe, while attacking from a *Yunti Che* (**I**) [46] which is a wheeled assault ladder being positioned by people below. Spoked wheels can be seen under the device in the full battle scene. The head-gear depicted on these warriors might be a simple cap to keep hair in place, as depicted on Qin & Han ceramic tomb guardians, or possibly leather helmets. The two standing figures show ji-halberd armed warriors, one with a short sword in their other hand (**J**) and the other with what is likely to be the severed head of a defeated enemy (**K**), a practice in war which was taken to new heights by the Qin military during the Warring States period. Advancement in rank was tied to the taking of enemy heads. An unhappy edict for prisoners of war.



Figure 47: Late West Zhou/early Spring & Autumn ge



Figure 48: Late Spring & Autumn/Warring States ge

The use of both very long poles & the shorter pole-mounted ge each deserves consideration over their efficiency. The longer pole-mounted *ji* & *ge* would be best employed for broader hooking & cutting with inside edges instead of a fine point puncture strike. It requires less precision to use such unwieldy weapons against a target. This is because manipulating the blades small point into an enemy at a distance of 3 or more metres is unlikely to be easily, but a swing and a dragging cut could easily snag a person in its wide hooking arc. Rather than just relying on a puncture the dagger-axe became efficient at using the large angle of exposure of a blade which traverses a broad area, another reason why a long *hu* (blade extension) and an optimal *yuan* (blade) angle would make such a weapon more efficient in this motion.

Figure 47 represents the general style used at the beginning of the Spring & Autumn period while figure 48 is a sort with a more rounded blade point and a less angular silhouette which evolved over the period. It is very similar to a published late Spring & Autumn example excavated from the state of Wu. Figure 48 is typical of the late period and as such the style then used during the early Warring States period. The greater utility of a dragging cut during striking is revealed by two different design features (long *hu* & blade alignment) that become universal on what I call 'classic' style dagger-axes as opposed to 'archaic'.

46) Liang Jieming: 'Chinese Siege Warfare: Mechanical Artillery & Siege Weapons of Antiquity'. 2006.

The importance of *ge* in the Warring States period is also indicated by tiny dagger-axes which appear to be a type of coinage. Coinage of the late Eastern Zhou period often took the forms of objects that were valued, items that may have been used for barter in the past. Well known types of early coins are little thin knives & little shovels and it seems that miniature *ge* are also a type of currency. Initially examples of these *ge* were very rare and were assumed to be miniature weapons for burial purposes, weapons for wooden or ceramic tomb guardians. In recent years such quantities have been found they are thought now to be a type of currency. The 'coin' takes the form of the 'classic' *ge* about 10cm long, with a *hu* blade extension, a long upturned blade, a perforation *nei*, and several holes for binding.

The dagger-axe was obviously a culturally significant object to be selected as a form of currency.



Figure 49: Ge coin.



Figure 50: Ge coin.

Blades from the end of the Western Zhou period, and quite typically during the Spring & Autumn, were set upturned at around 100° to the pole which suited a dragging cut using the inside edge and the mechanical 'pull' of an angled blade. There was also the *hu* development (which had began in the late Shang) of extending the blade below the point down the inside of the pole, the length of this *hu* blade grew over time as did the number of perforations on the *hu*. The typical dagger-axe then emphasised a blade extension running parallel to the pole, instead of just a projecting dagger point.

The style appearing at the close of the Western Zhou era is a quite significant mechanical innovation based on only the very simple *hu* which the Shang first employed. The tip of the blade being shaped like the point of a triangle is also typical of the dagger-axes which appeared at the end of Western Zhou, and was common too on the early Spring & Autumn period dagger-axes. The Warring States period shows a different preference over blade style. Figures 48 & 51-52 show this evolution even further from the Western Zhou style.



Figure 51: Warring States ge



Figure 52: Late Warring States ge

Also suited to a dragging cut these later dagger-axes of the Warring States period could have both the angled blade with an addition final in-turn of the tip. Some even had serrations on the inside edge which would make horrific injuries. These final stage dagger-axes are very highly developed towards mechanical efficiency, versatility, and lethality. Such weapons have design features that set them far apart from their ancient origins in the simple blades of the early Bronze Age Erlitou & Shang. A notable feature is the addition of blades onto the rearwards facing *nei* (Figures 52-54).

Sharpened *nei* occasionally carried inscriptions. Figure 54 shows an enhancement of such ancient characters carved into the bronze. Figure 53 is a *ge* of Qin state, of the same late Warring States type as found with the buried army. The Qin *ge* has its own inscription (not shown) which dates it before the reign of King Zheng. It also has very heavy corrosion, and even loss to the edges, which contrasts with the preservation of the Buried Army's weapons, attributed to a surface treatment of potassium chromate. This style of late Warring States *ge* with a sharpened *nei* was used by many states, and versions with inscriptions have been excavated within the area of ancient Zheng & Han states (Yang 1992). Of the Qin *ge*, in the later periods these inscriptions were purely for quality control & accountability for errors, as required by the Legalist system. Rather than naming an owner or event, such as once was popular, they listed the names of people involved in a weapons production & their supervisors. This was to allow for quality control and the punishment of sub-standard work.



Figure 53: Qin state ge.



Figure 54: Example of nei with sharp blade on another Qin state ge.

The origin of the classic East Zhou ge is shown by two early examples, figure 55. They can be viewed as fitting to the early chronology in the development of the 'classic' ge by examining their features in turn. The larger dagger-axe is of the style which appeared at the very end of the Shang period and was used in the early-West Zhou. The other is of a type that first appears at the end of the Western Zhou period and was used in the Spring & Autumn era. The larger ge shows less refined features. It has a small total number of perforations for binding to the pole. The *nei* lacks a hole and the form is consistent with the early examples of ge with the *hu* extension of the blade down the pole.

Another suggestion of an early dating is that this piece was once bent quite acutely & certainly deliberately. On the surface there are even signs that a modern person made some attempts to straighten the *yuan* & *nei* using a vice. The damage the weapon has sustained is a particularly intriguing feature. I know of other bent Shang-West Zhou ge in private collections which are not consistent with natural burial compression or battle damage. Another ge I personally examined recently was clearly late Shang-Early West Zhou and the kink in the blade could not have been caused naturally or through use. It was a very robust blade yet had a deviation like a flattened 'N' along the blade which must have required 2 separate applications of force from opposite sides. A brief site inventory of a damaged Shang/Zhou site in Shaanxi yielded severely bent dagger axes, visibly of a same type as the ge in figure 55 [47]. I have concluded it is likely related to the practice of 'killing the weapon' to send it into the next life with the owner, as this mutilation is quite extreme. Such bending is more dramatic than any natural bending or damage occurring from burial compression by earth pressure. One example from the Shaanxi site was even bent so it resembled a letter U in profile. The ancient practice of mutilation of weapons is revealed by Shang-era sites. Ge {of jade} are often found broken in Shang sacrificial pits, with jade ge being broken in multiple places. [48] The practice of breaking jade ge into 2 or 3 segments and placing them in small pits originated in the Shang period (Forsyth 1995). Both the physical and cultural clues then suggest an earlier dating for the larger ge.



Figure 55: Late Shang/early West Zhou style ge & Late West Zhou/early Spring & Autumn ge.

47) Wenwu (cultural relics) Number 6. 1992. Pages 72-75

48) Robert W. Bagley: 'P'an-lung-ch'eng: A Shang city in Hupei'. Artibus Asiae. Vol. 39. 1977.

The lower smaller dagger-axe in figure 55 is a 'typical' example from later centuries of a mature 'classic' style of ge. Notable is the angle of the blades projection from the alignment of the pole (a dotted line shows 90°) and triangular-pointed appearance of such weapons at this time. The perforations are more numerous than its larger companion, with a perforation on the nei & the upper edge of the yuan for better securing. The riser on the blade is also a West Zhou feature that faded out of use, but this style forms an early horizon for the appearance of the dagger-axe as a mature weapon. The Spring & Autumn style dagger-axe here I had previously mounted on a 1.5m pole to gain an impression of the weapon. Despite the weapon looking unassuming as a detached blade it becomes something like a long handled tomahawk in feel. It is light, but could have very quickly pierced or hooked enemy flesh. It does reinforce to me just how effective the larger, heavier, and more lethal designs that came later must have been.



Figure 56: serrated late-Warring States ge.

The savage appearance of certain Warring States period ge serves as a metaphor for the increasingly brutal & serious nature of warfare during that era. The final conclusion from generations of conflict was now a matter of life and death for competing states. Military campaigns of greater duration and severity mark the later stage of the Eastern Zhou period. Manpower was crucial in the quest for victory (Ebrey 1996). While the number of individual conflicts in the earlier Spring & Autumn period was no less significant the wars were shorter and less calamitous for those involved.



Figure 57: serrated late-Warring States ge

Previously inter-state disagreements might be solved by conferences of diplomacy (Cotterell 1981). A battle between feudal lords would ideally commence at a time and place of the rivals choosing with the Zhou constitution outlawing opportunistic war (Jian 2001). Philosophers during the Warring States period sighed for this past era, their sentimentalising of a perceived golden age would infuriate the Qin councilor Li Si & the First Emperor. Before the Warring States period conduct on the battlefield was a way to increase social standing.

In the Warring States period individual heroics and honour still counted, but the role of champions was diminished simply by the huge scale of infantry armies produced by mass-conscription. In particular Qin could be said to have scorned the gentlemanly notion of war along with replacing the feudal system. Promotion was based on kills in battle. This translated into a grim practice of commendation & advancement being measured in the amount of enemy heads taken in action [49]. In the final cataclysm of the Warring States period the vicious intent of the combatants is reflected metaphorically in the design of these new serrated & heavy ge, simply designed to rip an opponent to shreds. The final outcome mattered most in conflict (Yates 2007) all pretenses were cast aside. As examples of experiments along the theme of greater damage & lethality are dagger axes of the Eastern Zhou which were mounted as 2 or 3 dagger axes set on a single pole. Other strange and unusual forms with large rearward hooks like scythes exist. Figure 58 can be compared to excavated examples of multi-mounting dated to the early Warring States period. The lower ge lack the *nei*, as is typical, and lower mountings blades tend to be progressively shorter. Figure 59 is of a type where the rear *nei* forms a hooking tool, the example here is especially large but smaller scythe-like rear fittings and some even with serrations on *nei* are shown amongst published examples of East Zhou weapons.



Figure 58 (above) Figure 59 (below): New dagger-axes of the mid-late Eastern Zhou period.



49) Jack L. Dull; 'Empires Ascendant. 400BC-AD200' 1988.

Neither of these forms appears to have met with the same success as we see in the late-Warring States ge with the sharpened *nei*. The late style of dagger-axe (figures 52-54) was also combined with a spear and made into the two piece halberd such as first appeared in the Shang period. Such halberds, as shown in bronze art and the evidence from excavations, were more common than ever.

Such *ji* halberds were a very important weapon of the late Eastern Zhou battlefield as they combined the advantages of spear & ge. [50] The *ji* of this type has been called the "six-bladed halberd" [51] for the 3 pairs of edges, and the fact it will put a sharp edge into contact with an enemy not matter which way it comes at them. See figure 60.

Below is the combination type of spear & ge mounted together, the '2 piece' halberd, with its fittings in place as they were aligned on a pole. There were many variations on the *ge* & *ji* being used contemporaneously, probably due to the many independent production centres of bronze weapons of competing feudal states which developed their own innovations. Figure 60 is a version of late period *ji*, this being a halberd of Qin state. The spears used in such Qin *ji* were shorter and more robust than typical Warring States spears which used only the thrusting point (Yates 2007). In the late Warring States period the *ji* & *ge* had reached their ultimate development. Qin state examples of the late 3rd century BC show the result of over 1,000 years of warfare.

The rear tang (*nei*) on such Qin *ge* were sharpened to have a reversed stabbing blade. The blade which projected down the pole (*hu*) was very long, even longer than the 'dagger' blade itself. The number of binding holes was greater than earlier period so the long *hu* allowed for more secure attachment as well as a larger cutting surface. The 'dagger' blade (*yuan*) also curved inwards slightly as it progressed towards the point in the fashion of a true hook. Such a weapon could puncture and hook and slash, and when the spear was added above it could also thrust. Similar dagger-axes to this final Warring States period form were used in the West Han period for a short time, before being replaced by a very different style of '*ji*' which was then used throughout the Han period.



Figure 60: Qin halberd 3^d century BC

50) 潘晟: 'Qin Shi Huang's Underground Empire'. 2006.

51) Robin Yates: 'The First Emperor. China's Terracotta Army' 2007.

'Han' Ji & the obsolescence of bronze weapons



The bronze dagger-axe still remained in use for a short time during the Western Han dynasty, as it is depicted in West Han art. Its extremely rare appearance in Eastern Han graves (Yang 1992) I would consider as tomb items only (*mingqi*: for 'use' by the deceased). Bronze weapons at that time were long since obsolete. Han period *ge* were closest to the appearance of Qin *ge* with a long *hu* but often a very long *nei* also. This *nei* was sometimes sharpened. Figure 2, as shown in the initial introduction & shown above, is an example of Han dagger-axe of a functional design. As such this represents the final use of a fully mature form of dagger-axe weapon before they vanish from combat.

A new & very different weapon, also called a *ji*, became the main polearm of the Western & Eastern Han period. This was the Iron Age successor of both the bronze *ge* & 2 piece *ji*. For ease of understanding I will refer to this type of weapon as a "Han *ji*" due to its very different nature, although the actual origins are slightly earlier in the late Warring States period.



Figure 61: iron *Ji* halberd of late Warring States style.

The dagger-axes disappearance is roughly contemporary with another break with the ancient style of warfare. During the Western Han dynasty chariot formations vanished from the battlefield. Chariots went into a decline from the late Eastern Zhou but they were still used both in the Qin dynasty and beginning of the Han dynasty as there is both historical and archaeological evidence for this. The possible reasons for their final obsolescence are varied; it is quite likely that there were many contributing factors. Chariots in the Western Zhou to Spring & Autumn period were just as much about show as about military efficiency. Elaborate extra fittings and bronze decoration show the vehicles to also be part of a culture that mixed ceremony/ritual with war & sport. In the Warring States period as the nature of inter-state war became more *outcome* focused rather than *conduct* focused the chariot was both simplified structurally and the mechanical design of the halter & wheels improved. (So & Thorp 1993.) At this time the most elaborate & weighty fittings were abandoned. The chariot was still an expensive item but apart from redesigns which may have improved its effectiveness the small & stocky stature of the native ponies may have been better suited to act as chariot teams. As the territories of the various Warring States expanded, especially as Qin & Chu penetrated into the south of China, the terrain became less suitable for chariot warfare. In the Spring & Autumn period with battles at an agreed time and place the chariot would perform well, but the southern style of warfare relied more on infantry based forces (Rawson 1980).

In the 4th century BC the Zhou first adopted cavalry archers, traditionally attributed to the will of King Wuling of Zhao. This was controversial as it was seen as against Zhou custom to emulate the 'Hu' nomads of the north. Worse still it required the adopting of Hu nomadic dress. The Chinese had defined themselves as a cultured people who wore certain clothes and their hair in a certain fashion. The trappings of the mounted nomad were barbarism personified.

The wearing of trousers by the Hu nomads is another example of the broad homogeneity amongst steppe cultures. Trousers were much more suited to both a cold climate and a mounted lifestyle. This was no conciliation to Zhou cultural conservatives. Numerous features show the Hu to be a Scyth-Siberian branch of Eurasian nomadism. Trousers are also recorded as worn by Western Scythians in the 5th century BC by the Greek historian Herodotus. A comparison between Scythian saddles from the site of Pazyryk (5th century BC) & the saddles of cavalry in the Buried Army confirms a steppes inspiration for Chinese cavalry (Michaelson 2007). King Wuling was therefore condemned for such revolutionary pragmatism. He put it well when he said: "...a talent for following the ways of yesterday is not sufficient to improve the world of today" (Di Cosmo 2002) No doubt connected to this revolutionary idea, a new artefact appears during the Eastern Zhou period: The bronze belt hook. This was naturally required for a people that would begin to wear trousers. Belt hooks became a common item in China, not restricted to cavalrymen, they also became objects of adornment for those with the wealth to have their belt hooks gold gilded or inlaid with glass, jade or silver.

With the formation of the Qin Empire in 221BC and then establishment of the Han dynasty in 212BC Chinese armies were to begin an even greater expansion of territory beyond the central plains. Han China's contemporary 'barbarian' enemies in the south & southwest required combat on terrain completely unsuitable for chariot based warfare, such as rivers, contours and vegetation. On the northern frontier there was the serious threat of the swift mounted archers of the nomadic Xiongnu cavalry. Even massive Chinese armies based on infantry and attacking chariots had shown themselves to be too cumbersome in matching the initiative of large formations of nomadic horsemen ('Hu' barbarians). In Qin times these Hu barbarians were still fragmented tribes and were successfully driven from the Ordos region by General Meng Tian. Soon after a new nomadic empire united under a 'Chan-Yu' (Wades Giles 'Shan-yu') named Modun became a serious threat to Han China. In the early Western Han period the Emperor Gaozu (206-195BC) had personally suffered a military defeat when his army was lured by a feigned retreat and then cut off by a large Xiongnu force: "When the Han came to power, Gaozu ...was surrounded at Pingcheng, and put in great danger. Taizong ... was forced to submit to the humiliation of presenting tribute." [52]

A political solution & generous treaties were used by the Chinese to appease the powerful Xiongnu steppe empire whom thereafter were treated as equals. It was recognised, for a period covering generations, that China lacked the right resources to fight the Xiongnu warriors on their own terms. Only political solutions and long term subversive strategies were realistic (Di Cosmo 2002). During the reign of Emperor Wudi (141BC-87BC), Han China was ready to openly abandon such treaties & diplomacy. The resources available to Wudi were due only to generations of consolidation by his predecessors, and his wars still heavily burdened the country. Cavalry-based Chinese forces were needed to conduct swift campaigns against these nomadic horsemen, and more crucially horse breeding to cover heavy losses in massive steppe & desert campaigns. Efforts were made to increase Imperial horse reserves, encourage breeding, both to raise numbers and improve the bloodstock of physically small ponies. Exports of horses were forbidden. Exemptions to military service were offered to those who bred horses. Imperial pasturelands were created. By the end of Jingdi's reign there were 300,000 horses available for future campaigns [53]. Han historians record losses on campaigns that justify these preparations in depth.

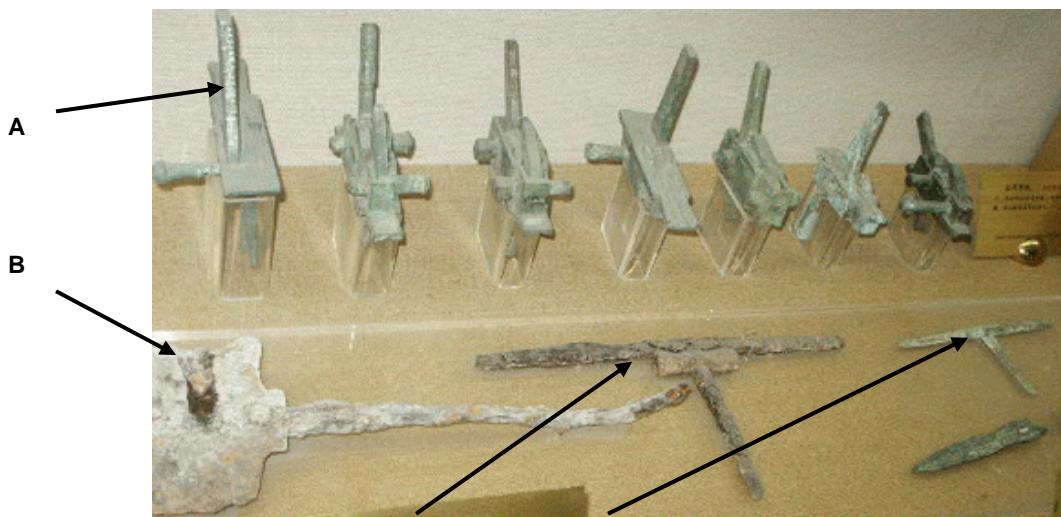


Figure 62: Han ji halberds. Iron ji (left). Bronze ji (right). Bronze crossbow mechanisms (A). Iron buckler {guo xiang} (B).

In contrast to dagger-axes and chariots of the ancient period we then see a change to new weapons and light cavalry forces. Miniature ceramic warriors dating from the early West Han period at Yangjijiang near Xian show that such light cavalry were armed with either bows, with quivers on their backs, or with halberds [54]. Comparing the ratio of cavalry to infantry/chariots in the Qin buried army, the statistical information from Han buried armies shows a growing percentage of cavalry.

52) John E. Hill: 'The Western Regions according to the *Hou Hanshu*'. 2003.

53) Victor Choi: 'Horses For Eternity'. 2007

54) Carol Michaelson: 'Gilded Dragons'. 1999.

Chariots are represented in some early West Han ceramic armies [55] but show a comparatively diminishing presence. In the same buried army that surrounds Emperor Jingdi's (157BC-141BC) tomb we have no examples of dagger-axes amongst swords, spears, and other weapons, all of the halberds in Yangling tomb are of iron & of the "Han ji" type. Thus the dagger-axe was not to be found in a Han buried army from the mid second century BC.

Just as the dagger-axes long history on the battlefield drew to a close so did the battlefield chariots role as a combat formation. Certain types of chariot fittings that were used for centuries are longer found after the West Han period. Chariots depicted in Han tomb lintel art simply represent nobles on hunts, although some chariots may still have carried drums and banners for battlefield communication. Han Generals still carried titles such as "General of Chariots & Cavalry" but the forces historically recorded in late-West Han campaigns are comprised of infantry, crossbowmen, cavalry & even Hu nomad auxiliaries. By the Eastern Han period the 'chariot' title remained, but was given as an honorific to non-military men & palace eunuchs, a sinecure of no real responsibility [56]. The chariot was no longer a basis for a military formation nor was it buried with nobles as an expression of might since it did not represent armies of the period. The final demise of the ge as a weapon of war is closely followed by the end of this chariot era.



Figure 63: Han bronze *ji*. Length 27cm.

Figure 64: Iron *ge* from the 2nd century BC.

A major reason for the demise of *ge* quite separate to the decline of the chariot was that steel would finally replace bronze weapons during the early to mid West Han period. Great advances were made in the workmanship of iron and the quantities in which it was produced. The significance of this is because the 'Han' *ji* has a form more suited to manufacture via iron working. The complex silhouette of the dagger axe was more suited to casting. Weapon steels were wrought into shape by hand so this is reason enough to redesign & simplify the standard halberd for mass output from iron foundries. Figure 61 is a rare iron type where perforations were added to an iron blade. Such a shape would require a mechanical press and then working of holes through forged iron, a more difficult task & one that can be seen to mimic the perforations that were routinely produced on cast bronze weapons, specifically *ge*. There is scant evidence for attempts at making iron *ge*. One example of such an experiment was found in the tomb of the King of Nanyue in Guangong (64). If the museum arrangement is accurate, the blade angle and the setting of the counter-balanced blade (a form of *nei*) means this is not a *ji*.

Weapon steels required skilled artisans who controlled the amount of carbon in the iron and altered the microstructure of the blades by tempering and quenching. The qualities of superior steel were well appreciated, as sword blades were inscribed with declarations of the number of times the steel was tempered. Bronze technology for blades had long since reached the limits of their potential. In contrast the steel industry was up to a very high standard & output by the late West Han. Steel production was made into a government monopoly during the reign of Wudi. The decline of bronze weapons would have been steady throughout the early West Han based on the diminishing numbers of bronze swords across early to mid West Han graves (Yang 1992). For a short time bronze *ge* & Han-style bronze *ji* would be wielded by warriors in combat. Eventually only steel weapons & only the *ji* would be carried to battle. Early steel & bronze had existed side by side for centuries before the Han period. The use of steel for weapons was far from universal amongst Zhou states nor was such steel of consistent quality. In the Han period this changed. To understand the persistence of bronze weapons in China the qualities of the earliest steel should be examined. Early 'steel' was not comprehensively superior to bronze during the late Eastern Zhou period. I will discuss this in a later section on iron & bronze metallurgy.

The Han period represents a belated end to ancient styles of warfare. The Han had new materials, new tactics & new weapons. Amongst these was the new *ji* weapon. It is shown in Han-era art as being used by a cavalryman to drag another horseman from their saddle (Cheng & Zhong 1991). The spear-like point and projecting side blade would make this a good weapon to either face horsemen, or to be wielded by horsemen. Such contemporary art of its use from horseback suggests the point perpendicular to the shaft was driven into the side of the enemy and used like a fisherman's gaff to topple the enemy from their mount.

55) Wu Xiaocong: 'Han Yangling Museum' 2004

56) Rafe de Crespigny: 'Later Han Military Organisation'. 1996

In the context of the Xiongnu threat there is a well preserved discussion on Han military capabilities. The Han Shu records the councillor Chao Cuo (晁錯) advising Emperor Jingdi on military strategy :

平陵相遠，川谷居間，仰高臨下，此弓弩之地也，短兵百不當一。兩陳相近，平地淺草，可前可後，此長戟之地也，劍楯三不當一。萑葦竹蕭，中木蒙龍，支葉茂接，此矛鋒之地也，長戟二不當一。曲道相伏，險阨相薄，此劍楯之地也，弓弩三不當一。

The plains between hills, large valleys around a river, slopes of hills, these are bow and crossbow country. Even one hundred short weapons could not oppose one of them. When two armies are close to each other, flatlands with scarce vegetation, where one can move forward and backward, these are ji halberd country. Three swords (jian) and shields could not oppose one of them. Reeds and bamboos, where plants and trees cover the earth, where branches and leaves are close to each other, this is short metallic spear (yan) country. Two long polearms could not oppose one of them. Winding paths which hide armies, narrow gullies and obstacles, this is sword and shield country, three bows or crossbows could not oppose one of them.".....[57]

The ji halberd is also mentioned during Chao Cuo's comparison of Xiongnu & Han military strengths. As warfare in the Eastern Zhou had revealed there were limitations to the use of chariots. Chao Cuo explains that in the presence of ditches and gullies, streams & rivers, hills or bush one footsoldier is worth 2 chariots but on an open unobstructed plain however one chariot was worth 10 infantry (Yang 1992). The crux of the military problem was however the Xiongnu, a nomadic people born into a saddle and mounted archers of excellent ability. In facing them Chao Cuo noted their equestrian skill & archery which the Chinese could not rival. Even the nomad's ability to withstand a savage climate & hardships was credited to them. The Han military was superior in certain aspects over the nomads:

"Given flat ground {the Han light chariots & charging cavalry 輕車突騎 [58]} could throw the Hsiung-nu {Xiongnu} mass into confusion: strong crossbows and long halberds could strike at a distance and the Hsiung-nu found them irresistible: equipped with stout armour and sharp swords of various types, and crossbows, the Chinese serviceman could advance in formations of five to ten men which the Xiongnu could not confront; they could concentrate volleys of arrows on a target in a way that the leather armour or wooden protection of the Hsiung-nu could not withstand: and, finally, the Hsiung-nu were no match for the Chinese when fighting dismounted or at close quarters."(Psarras 2003).

In quoting Chao Cuo, Yang Hong's & Sophia-Karin Psarras' translations differ in that the former only mentions chariots the latter only mentions cavalry. This is an important point as both chariots and cavalry were still in use during the early West-Han (as this amended passage states). Chao Cuo's passage supports the point made by Di Cosmo that the Han military was still in a period of transition before Wudi's era, in contrast Psarras suggests the Han has sufficient cavalry to confront the Xiongnu before the reign of Wudi. I am of the opinion that given the strain that Wudi's war placed on Han China that Di Cosmo is closer to the truth in that the Han required consolidation and preparation in depth before meaningful war was possible. While Chao Cuo was certainly optimistic, since the elusiveness & mobility of the Xiongnu was as much a problem as their mounted skill, the passage provides good account of the equipment of the Han. Iron lamellar armour, powerful leg loaded crossbows (which could outrange an arm drawn composite bow) and steel halberds and long bladed steel swords. The Xiongnu were not inclined to stand and fight such formations but one infamous Wudi-era battle shows Chao Cuo correct:

"...{Chief Commandant } Li Ling...led his troops {30 days into the steppe}...and arrayed them, ordering the front ranks to bear {polearms} and shields and the rear ranks to bear bows and crossbows. At the sound of the drum they were to advance; at the sound of the bell they were to stop. The Huns attacked, and Li Ling's footmen awaited them unflinchingly, while a thousand cross-bows, which outranged the Hun {recurve} bows, were discharged at the Huns. The effect was terrible; the Huns fled to the mountains" (Legge 1898).

Before Wudi's reign the Han had been required to use non-military means to manage the Xiongnu. The Heqin treaty was a subversive strategy where nominal peace was secured by extending gifts to the Xiongnu leadership. Han maidens presented for marriage were seen as a means to soften the sensibilities of their ruling house. The frontier was garrisoned and periodic incursions by very large Xiongnu forces were endured by the Han who mobilised in response to each raid. Several times it is recorded that by the time Han forces mobilised in numbers to drive away large raiding forces the Xiongnu had already drawn back over the frontier with booty and captives. Wudi was able to use all the resources built up by the peace his forebears gained and struck the Xiongnu across the frontier. The economic strain of pursuing war with the Xiongnu was lamented & debated in ancient times and the war was not immediately conclusive:

"...{Sima Qian} gives a picture of the economic calamities that came upon his country while Emperor Wu was exhausting the reserves accumulated during the peaceful reign of Emperor Wen. The Emperor drained the country...The wastage in the army was especially great...In 129 B.C {defeats}...lost 7000 men. In 123...more than 3000 cavalry were killed or surrendered. In 121 {defeats}....lost most of 4000 men. In the strenuous campaigns of 119 {steppes campaigns caused losses} by the ten-thousands, and more than a hundred thousand army horses were worn out and died. In 103, Li Kuang-li lost eight to nine-tenths of...of several ten-thousands of men. In 102, Chao P'o-nu was captured {along} with 20,000 men. In 101, Li Kuang-li brought back from Ferghana only ten thousand-odd out of sixty thousand men. In 99, he again returned, having lost six to seven-tenths of a much larger force. In that year all but 400 of Li Ling's 5000 famous foot-soldiers were destroyed...{etc}." (Legge 1898).

Wudi did not live to see the final breaking of Xiongnu power. He left many issues behind for the Emperors that followed him, but his belligerency had succeeded in fragmenting what was a formerly united steppes empire.

57) The HanShu: extract from the 19th Biography. Translation by Francois Charton.

58) Yang Shao-Yun: personal correspondence.

59) Donald Wagner: 'Early Iron in China, Korea & Japan. 1993.

Not until the late reign of Emperor Xuan (74-49BC) after losing much territory to repeated Han offensives was the Xiongnu confederacy facing internal fragmentation. Once driven from their expansive grasslands the pastoralist Xiongnu Empire was in crisis. From the Han Shu:

... "In the past, the Huns many times made border raids and the people were injured by them...{now}...Various [Hun] kings simultaneously set themselves up and divided [the Hun realm between] five Shan-Yü. In turn they attacked and fought with each other.... the [Hun] flocks and herds have been largely destroyed...and their people are hungry and starving.... Because of these...disturbances...Shan-Yü Hu-su-lei...surrendered [to Us]....Shan-Yü [Hu-han-hsieh] called himself [Our] subject....The northern borders are at repose and have no military concerns." (Legge 1898).

The 'ji' which became standard within this grim context was to remain the most important polearm or "long handled weapon" during the Han dynasty (Yang 1992).

The first appearance of this style of halberd occurred in the late Warring States period and included both a perforated type (see figure 61) and a simpler form, often with a bronze cap which joined the shaft to the blade. This second type of iron was standard during the Han period (see figure 62). It had been used at the final stages of the Warring States period by the state of Yan and made in early steel [59]. Being forged as a single object it might be compared too the West Zhou style of *ji*, but had a unique appearance. Examples of this new type of *ji* were found within a mass grave of 22 soldiers of the state of Yan, along with iron armour, swords and crossbows, dating from the late 3rd century BC. For states like Yan, which made weapons of iron, the *ji* is more suited to weapon production than the form of the bronze *ge*. This is probably an important reason the Han adopted this design from Yan state. Apart from ease of output there is an economic case for switching to iron *ji*. While the quality of Yan steel is a separate issue, iron ore is typically a more abundant resource hence cheaper as a base material. Bronze compositions as used by ancient Chinese in comparison required 3 metals to be mined and then combined into an alloy, (copper, tin & lead). We can then add supply of raw material to a list of reasons that iron *ji* would come to replace bronze *ge*.

The common 'Han' *ji* returned to a right angled side-blade and would be more a puncturing instead of hooking weapon. This basic form of *ji* was then used for over four centuries. In the post Han period the standard *ji* of this sort faded from use and more commonly the side projecting blade was *upturned* to create a second thrusting point. The period of weapons development after the Han dynasty is however beyond the present scope of this article. Some examples of Han *ji* exist with angled & upturned blades and even one published example that appears like a mix of both *ge* & *ji* which used a more open angled side projection (Cheng & Zhong 1990). Like the unusual form of figure 64 we can infer that the persistence of the basic *ji* with a sideways projecting blade over such a long period of time shows Han military minds were satisfied with this form as the standard.

Another unusual variation on the *ji* halberd is a hand halberd of much the same form. As shown in Han art we can see that it was gripped in the manner of a sword. A depiction of combat in Han-era art shows this hand halberd being used along with a special sort of iron shield, a buckler called a "gouxiang" which had a hook &/or a spike. A portion of a corroded iron hook-shield can be seen in figure 62. This very curious looking tomb guardian (figure 65) can be seen to be holding one of these hand halberds, along with a shield. He also has a ring pommelled dao (with tassel) tucked into his belt. This creature (?) is in a lively Sichuan style, such distorted features are emphasised so that they instill fear into malevolent spirits. This tradition of semi-human tomb guardians began in the Eastern Zhou period.

Pole-mounted bronze *ji* had a similar form to iron *ji* but there is one difference. Iron *ji* are typically larger. In the Eastern Han period these steel *ji* were larger still. Some immense blades of 60cm in length (Yang 1992) would then be almost twice the size of similar bronze examples. A Chinese museum specimen here shows such a large *ji* example (figure 66) alongside swords in the region of 80-100cm. In the early West Han the scaled-down weapons of a miniaturised buried army at Yangling provide consistent evidence the iron *ji* were not so immense at this early date. The larger size available to weapons made of steel was another advantage over bronze. Making a long iron blade is not inherently more difficult than making a short blade, but casting long blades of bronze risks cooling in the mold and the chance of flaws. Bronze *ji* are most often around 30cm in length across their greatest axis. My own feeling is that other than those occurring in the early West Han period the rest should be considered as tomb objects (*Mingqi*: for funerary use). This is my feeling for Han bronze weapons in general. They relate to the mortuary industry. Only the earliest Han bronze *ji* would be likely to have seen battle as the Han inherited a limited iron industry from the Qin dynasty where iron was used for purposes other than weapons.



Figure 65: Han period figure with hand halberd

59) Donald Wagner: 'Early Iron in China, Korea & Japan. 1993.

While bronze *ji* can appear suitable for use in warfare their smaller size and the more effective & cheaper iron alternative would quickly make such bronzes obsolete. Bronze *ji* do preserve much better than ancient iron weapons and so act as a good representation of the form of Han halberds. By the mid-West Han period warriors were armed with steel weapons, bronze persisted only for arrowheads and crossbow mechanisms due to its superior casting abilities. With steel being produced in huge volumes at many Imperial foundries there is even evidence for the export of wrought iron steel plates (heat decarburized steel) to ancient Korea from such production (Wagner 1993). Weapons in Han style that are rendered in bronze commonly have features that suggest they were never intended for use; very light cross sections are quite common.



Figure 66:
Massive iron *ji*.

Han *ji* of bronze from anything but the early West Han period are therefore representations of more earthly (iron) weapons. The prestige & lustre of bronze led to its continued use in the Iron Age by people wealthy enough to commission objects for tombs. The production of grave goods was crucial for people who believed the afterlife was a material mirror image of life. The wealthy wanted to take their lifestyle with them. "*Chinese tombs were microcosms of the world known in life*" [60]. Meeting this demand was a 'mortuary industry'. With the competition for resources that would otherwise serve the living there were official Imperial regulations on the quantities of bronze that were allowed to be used in tombs according to the social rank of a given individual. Since full sized & functional bronze weapons were buried in the Eastern Zhou period, with less evidence for miniaturization at that time, the consistency of light bronze weapons in Han tombs is related both to this cultural belief, demanding objects for the afterlife, and the worldly concerns of Empire. Bronze coins were one basis of the Han economy (along with silk & grain) so these economic restrictions help us understand the existence of Han weapons of otherwise impractically light construction. Emperor Wendi (180BC-157BC) lamented that providing tomb furnishing for the dead could impoverish families. Prohibitions on the use of jade, silver & bronze for burial with the dead were then put in place by the benevolent & frugal Emperor (So & Thorpe 1993). This prohibition is why the famous tomb of Lady Xin, marquise of Dai, yielded masses of miraculously preserved silk objects and lacquerware. The extreme care with which her tomb was sealed at Mawangdui was based on Chu culture tomb construction and the huge inventory of silk was due to furnishing a burial within the bounds of an Imperial edict.

Wendi was sincere in his concern. As he contemplated his own death and funeral he announced:

"We have heard it [said that], of all [plants and animals] that sprout from or are born to any of the beings in the world, all of them, it seems, have to die. Death is a law of Heaven and Earth, and the nature of things. [Then] how could it be [so] greatly lamentable? [But] in the present age all esteem life and hate death; they elaborate burials, thereby ruining their estates; they perform a rigorous mourning, thereby injuring their health. I disapprove of this very much.....Do not make a display of chariots or soldiers' weapons, and do not send people to wail and lament in the palaces or halls".....{The Han Shu records:}..."When he constructed the Pa Tomb, he altogether [used] objects of pottery and did not allow the use of gold, silver, copper, or tin as ornaments. He took advantage of [the rise of] the hill [where] his [grave was built], and did not raise a mound [upon his tomb]."....

Wendi's concern was not shared by his peers and the scale of the expense & resources committed for Imperial tomb construction amazed people even in ancient times. From an appendix of the HanShu:

"Emperor Min [AD313-317] asked [So] Ch'en, "How is it then that there are so many things in the Han tombs?" [So] Ch'en replied, "When the Han [dynasty] Sons of Heaven had been on the throne for one year, they made their tombs. The tribute and taxes of the empire were divided into three parts: one provided for the ancestral temple; one provided for [the entertainment of] guests; one provided for the tomb. The years that the Emperor Wu of the Han [dynasty] enjoyed were many and long; when he died, the Mou Tomb could not contain any more articles and its trees were already two spans [in circumference]. The 'Red Eyebrows' [a group of bandits, ca. 23 A.D.] took the articles from the tomb, but could not diminish them by half. Today the decayed silk is still left there, and the pearls and jade have not yet been exhausted." ... (Legge 1898)."

60) Jessica Rawson: 'The First Emperor. China's Terracotta Army. 2007.'



Figure 67: Han bronze ji. Length: 27.5cm

In confirmation of this the locality surrounding Wudi's tomb has still yielded celebrated artifacts in modern times, even without any exploration of the tomb itself. From this we see just how grand such tombs were, how much expense was involved. Naturally those beneath the Emperor sought to follow this fashion as best they could. Nobles and people of progressively lower ranks then strove to outfit tombs according to their station. Peripheral pits around the tombs of the wealthy reveal that miniaturisation was common in the Han mortuary industry. Of bronze weapons, and for those operating within restrictions according to social rank on the volume of bronze allowed, we then have lighter full-sized weapons or scale miniaturized weapons. I can also outline why I am convinced my own example of a ji (figure 63) and likely many other similar such pieces (figure 67) are *mingqi* items, rather than ever intended for use, based on an associated Han artefact.



Figure 68: Han sha. Length: 29 cm.

Sha & Mingqi

The weapon above is a form of Han polearm called a Sha 鏃. This example was made as a pair, which seems a popular practice. The partner weapon has suffered from burial compression. It had lost the crossguard and the blade is fractured, but it is the same. I am certain such sha were never intended for fighting as figure 68 has several points that make this improbable. Bronze weapons appear to be luxurious substitutes for Han steel weapons. The battlefield versions of sha were a similar steel blade with a more robustly constructed bronze guard cast around it, using the benefits of the steel edge and the casting abilities of bronze in one. The sha gives some protection to the wielder and is superior in this way to both the spear and *pi*: a double edged sword-spear (Cheng & Zhong 1990). While some bronze sha may be more robust Stephen Selby is also of the opinion his example, figure 69, is *mingqi* also. Both these bronze sha have a conspicuous loop, perhaps for a tassel. Other bronze sha are comparable to these in form & size. In contrast a detached sha guard (figure 70) of more substantial construction has the appearance of the style cast around a steel blade. In that instance it appears the blade was iron/steel and fitted with a tang onto a wooden pole with rhomboidal cross-section. The bronze piece covered the junction. [61]

61) Stephen Selby: personal correspondence.

The sha is classified as a type of pi weapon in a Song edition of the Eastern Han dictionary: the Shuowen Jiezi.
鍔：鍔有鐸也。从金殺聲。 ("sha: a pi that has a sword's crossguard on it. Contains the metal radical and sounds like 'sha' [kill]"") [62]

The pi 鍔 was a weapon which first appeared in the Eastern Zhou period and was like a double edged shortsword (*jian*) on a spear pole. The sword blade had a tang, rather than an integral hilt, which could slot into a pole and was then pinned through the tang. The sha evolved from the pi rather than an ordinary spear. The bronze Han sha have a socket, more like a spear, but it seems likely steel sha had the more conventional tang. As evidence of an evolution from a pi weapon a transitional Eastern Zhou sha in a private collection shows just how the sword-spear with tang evolved into the slender sha with the swept forward crossguard. Figure 71 is certainly an Eastern Zhou weapon as the narrowing of the blade is a feature of the short thrusting sword of that period and was not present on Qin or Han swords, nor Qin or Han pi. Such a weapon is robust & entirely practical. This is the ancestor of the Han sha of steel, and the Han Mingqi sha of bronze.



Figure 69: (above) Han sha.
Figure 70: (left) robust sha guard.
Figure 71: (below) Eastern Zhou sha.



Of the various types of sha just outlined I will now explain why I believe a bronze such as figure 68 was never intended for fighting. Since I could examine my own sha closely I could see the blade is slender and light, but still potentially functional. One common feature of Mingqi is also that the blade does not seem to have been ground down into a functional and sharp edge in the way a combat weapon can be. What conclusively shows it is impractical for function as a weapon is when I examine the socket. It is cast extremely thin and the socket shows a pole for slotting into this weapon at this location was only 15mm in diameter. Of many other socketed weapons of the Eastern Zhou, spears etc. their sockets are a third as broad again or much more at this point, and sufficient in strength to use in battle.

A thin pole such as this sha was attached to was too slender to take rigors of combat.

62) Yang Shao-Yun: personal correspondence

The thinness of the bronze socket means a potential for breakage under stress, as I can see occurred on one comparably thin-walled spear socket I have examined. The sha also has several air bubbles visible on the surface, tiny holes from gasses trapped in the liquid bronze. One such hole goes through the socket wall. While these holes are tiny, less the 1/2 a millimetre, and not uncommon on ancient bronzes, they look to me like they could cause critical failures in the structure when such a light weapon is subject to stress or impact. A robust cast sword might survive with a few tiny bubbles in the bronze but this would be a real weakness for such a light piece as this sha. This feature of cast bronze is one reason long slender bronze swords are less practical than long slender iron swords, and also why it was important for a bronze artisan to minimise gasses that were trapped in liquid bronze before the casting of an object. The sha socket is shown below. Two features of note are the variation of thickness along the wall of a socket (a minor imperfection common in many ancient castings) and the presence of partly mineralised wood along the interior wall. This shows that the mingqi weapons of this type were still attached to poles before burial.



Figure 72: Sha socket with wood fused to the mineral corrosion.

Since mingqi were created to smaller scale or were a lighter in construction it means their poles, such as belonging to this sha, were more slender than that used in combat. Excavated poles for mounting combat *ji* in the West Han period were a length of 2m (Yang 1992). This is a less cumbersome length than the longest poles of the Eastern Zhou, but still offered a polearms greater reach when compared to 'short handled weapons' such as swords. The bronze *ji* (figure 64) would have been on a similarly slender pole as the sha above since it appears to be from the same cache as the pair of sha, and likely made by the same hand. There is a distinctive & atypical earth encrustation on the three associated pieces (*ji* & 2 sha). The surface corrosion was consistent between them which indicates a similar bronze alloy and environmental conditions. The cross section of their blades, the manner of the polishing (consistent ancient abrasion marks) and general feel all indicates the items are part of a single hoard from the same location. Although the bronze *ji* does feel practical its association with the sha leads me to believe that it, and most other bronze Han weapons of similar appearance, are lightweight objects and not intended for use. It also means such weapons, based on the sha socket, were put onto smaller slender poles & if these were proportionate, length to diameter, as much as a quarter shorter than battlefield versions, i.e: perhaps 1.5m long *mingqi* polearms.

In discussing the poles that such weapons were mounted on there are 2 aspects of ancient polearms that show their own evolution and the influence of fashion across the long history of *ge* & *ji*: Pole cross-sections and pole decorations.

The poles for weapons used in ancient China could be a strong bamboo, or a hardwood, or even hardwood which was then covered with bamboo strips, bound by cord & lacquered (Yang 1992.). Such composite poles have the benefit of strength and durability...and beauty. Examples of poles painted with curving or geometric decorations and then lacquered in the manner of ornate lacquerware have been unearthed from ancient tombs. While spears could have a simple circular cross-section the poles of some dagger-axes & *ji* & *pi*-spears had either an oblong-egg shaped or tear-shaped cross section. This can be seen by examining the shapes of bronze caps which decorated the base of these poles and the consistency of this cross-section.

There is a logical benefit to some of the shapes which became clear when I examined a *ji* artefact in my possession and considered the styles of bronze finials that fit at the bottom of a weapon shaft (called "zun").

Eastern Zhou ji & surface features of ancient bronze



The *ji* below is remarkable for several reasons. It has unfortunately lost the tip portion of the dagger-axe blade due to a break in ancient times. There is also tin-oxide corrosion and loss to the edges along the artefact. The form can still be seen to be quite unusual. It is, in my opinion, likely to date from the Spring & Autumn period. The blade has an obvious riser which is consistent with swords & dagger axes of the period. The rearwards tang '*nei*' used on dagger-axes is not needed for binding since the *ji* is socketed. In this instance the *nei* had been sharpened. Being a one-piece *ji* this is of a type more popular during the Western Zhou period but the piece is not likely to be so early. The sharpened rear is not in the manner which occurred in the late Warring States period either, it has a single axe bevel instead of the normal double-edge (see figure 55). Being Eastern Zhou, one piece & socketed, it is not a sort I have previously seen published. Having a socket on his piece does give some information about the pole it was mounted on.

The *ji* also has traces of wood, plant roots, cord binding, and crystallisation of the mineral patina which provides other forms of information. The earth encrustation is not like a typical silt-like alluvial yellow soil found on many Chinese bronzes. My feeling is it may not have been buried in such a deep strata as most other bronzes, as plant roots are rare on bronze weapons. A specific geological region may explain this atypical soil appearance but this bronze has been close enough to the surface to be imprinted with fine root patterns and hence closer to the 'topsoil'. The plant roots were in contact long enough for minerals to form around them, now the organic matter is long gone but form of the roots is preserved.

Figure 73: *Ji* halberd.

This halberd was socketed then pinned at the spear portion & also bound via perforations to a wooden pole at the dagger-axe portion. Small traces of wood on the side of other dagger-axes do survive around perforations, *hu* & *nei*. The wood grain on this *ji* shows the pole was a hard wood rather than bamboo. The location of 2 small patches of wood suggests the *hu* inner edge was slotted *inside* the pole with the actual pole being larger in diameter than the socket above the *hu*. By this I mean a suitable channel was formed in wood below the socket, and the *hu* slid into this while a final portion of the pole was shaped to fit the socket also. This would have required extra preparation of the pole, with a significant guiding channel for the *hu* to slide into the wood when socketed. It suggests the pole was broader than the socket alone would suggest. At the uppermost hole for binding traces of the original cord can be seen in the soil. These are not mineralised and would likely crumble if touched with a pin. No longer organic, they are just a form held by the soil. Nearby is a white-opaque amorphous mass which is possibly cerasite or calcite {calcium carbonate}. Around the masses are also rods of a fibrous white crystal in tight clusters (see figure 76).

One intriguing feature of ancient patina is even a limited range of minerals can form in quite diverse textures and hues on the same object. Cerasite is lead-based corrosion, due to the presence of lead in the bronze alloy. Fragile rod-like formations are also seen on geological specimens of cerasite. Another similar looking opaque/white material, which instead forms from the soil rather than the bronze itself, is calcium carbonate, but calcium carbonate does not form in the same fibrous manner. The most common mineral that forms on Chinese bronze is malachite {copper carbonate}. For this reason Chinese scholars use the expression 'Green Bronze' for ancient bronze.

“青銅器”

A broad mix of colours can appear on ancient bronzes when the minerals cuprite & azurite also combine to create a mix of vivid green, red & blue in close association. Each mineral can potentially crystallise and produces its own geometric form. Cuprite crystals {copper oxide} are especially attractive, being angular and ruby-red. A great variety of minerals form on bronze, or affix from the soil, but a comprehensive account of patina formation is not my intention here.

Organic materials which were in contact with the bronze surfaces also supply evidence on the situation the object resided within at burial. Wood from sword scabbards, cord from binding, corrosion products from iron, contact with other objects revealed by imprinted shapes, and the individual strands of coarse vegetable fibres or fine silk can be seen in woven textiles held by a patina. The weave of those preserved textiles which have been fully mineralized, also known as "pseudo-forms", survive through contact with corroding bronze. Minerals leech into and replace the organic form.

The surface of ancient bronze therefore preserves many features that would otherwise not survive.



Figure 74:
Plant root pseudoforms on ji halberd.
Mineralised remains of formerly organic
material. Nei of figure 72.



Figure 75:
Mineralised silk cord with wood
atop preserved on the handle of an
Eastern Zhou bronze sword.



Figure 76: patina on ji halberd.
Fibrous mineral masses (A).
Traces of a coarse cord used in
binding (B). Hu of figure 72.

Figure 77 shows the atypical sharpened bevel of the rearward facing 'axe' on the *ji* (figure 73). This socket can also be seen as a compressed oval shape. The wooden poles cross section can be deduced as something like a tear-shape with the sharper angle towards the dagger-axe blade. Past the socket & toward the *yuan* is a raised shape on the bronze which abuts with the wooden pole of this shape. This completes and would match the shape of an egg or tear-drop shaped cross-sectioned *zun*. *Zun* were finials attached at the base of weapon poles also have this same shape. This reveals dagger-axe poles had a consistent cross-section, top and bottom. To make sense of this I will show some *zun*, and their sockets.

In combat such a pole shape meant the rounded part would be in the palm with the fingers gripped around the more acute (but still rounded) end. The blade could by feel always be turned out in the striking position by the touch alone due to this shape. In a thrusting spear a circular cross-sectioned pole would suffice but for the dagger-axe an angular pole meant a warrior shifting in combat, or adjusting his grip would always feel naturally how to present the weapon with the point facing at a striking angle.

Not all poles appear to have a consistent shape all the way along the pole. While it would be intuitive there are completely round *zun* that fit onto matching *pi*-spears. Such *pi* appear to have oval cross-sections close to the blade yet round at the lowest portion. Figure 69 shows an oval pole slotted into the area of a *sha* guard which is comparable to a *pi*. The detail 78 is of the *sha* artefact shown in figure 71. Its guard is also quite comparable to the detached 'robust' *sha* guard: Figure 70.

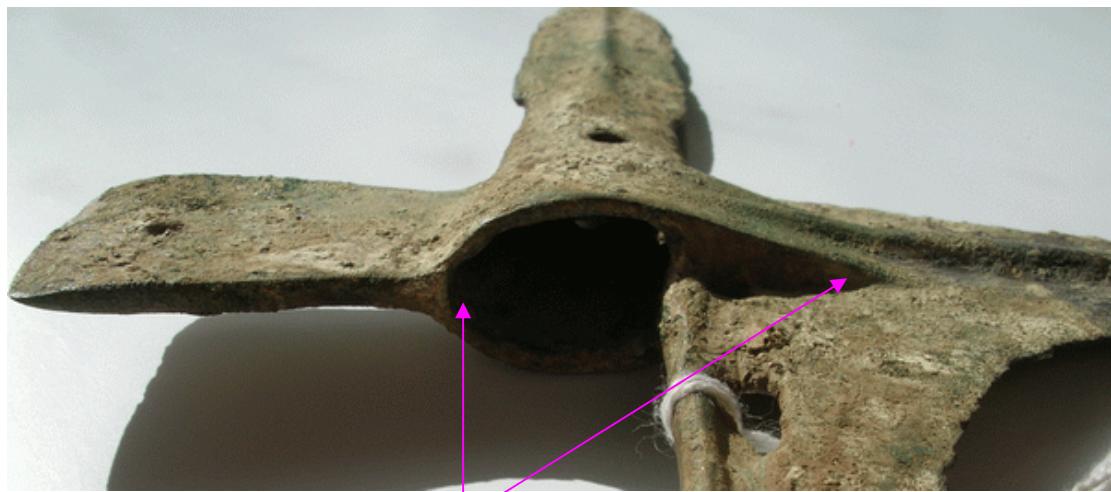
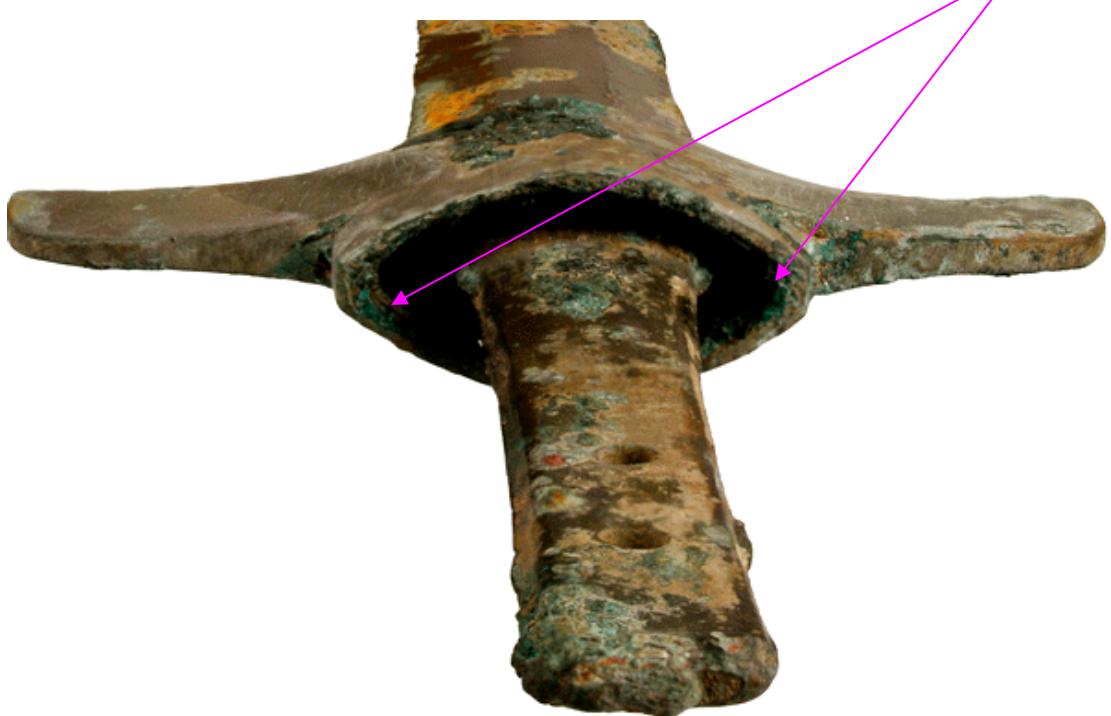


Figure 77: "tear drop" pole cross-section of *ji* {Figure 63}. Figure 78: Oval pole cross-section of *Sha* {Figure 61}.



Zun pole finials

Zun 鍾 decorated the base of weapons poles during the Eastern Zhou & Han period. These took the form of bronze caps which were shaped to fit the cross section of the pole they were mounted on. Other types of ornaments were mounted at the top of the poles above weapons. An ornament of the upper sort, from the Warring State period, was shown earlier (figure 51). The bird finial with head turned to look over its back was also used in the West Han period as ornamentation for ge. The original motif was popular in Chu state (Rawson 1980).

The Han-era dictionary Shuowen Jiezi mentions both *zun* & *dun* pole finials:

鑊: 杵下銅也。从金尊聲 ("zun: the bronze at the bottom of a weapon's shaft. Contains the metal radical and sounds like 'zun' [respect]'").

鍔: 矛 杵下銅, 鍔也。从金 聲。 ("dui {or Dun}: the bronze at the bottom of spear and ... shafts; a [type of] zun. Contains the metal radical and sounds like")

Unfortunately, there are two lacunae in this line, and one of them relates to how the character is pronounced.

鍔 is also sometimes written as 鐸.

These two characters have multiple pronunciations ('chun', or 'dui', or 'dun'). The distinction is based on the flat bottom of the dun style of finial [63], contrasting with the longer & narrowing base of the zun. The shape of the zun is possibly a visual metaphor for the tall wide mouthed bronze cups also called 'zun'. This character may be a combined phonetic & ideogram.

The distinction made above, contrasting a longer & narrowing base of the *zun* to the flat bottom of the *dun* is the one I will adopt here.

The use of ornaments to decorate weapon poles goes back at least as far as the Neolithic Longshan culture. Battle-axes blades of jade with matching jade pole finials have been uncovered (Forsyth 1995).

During the era of early bronze weapons there are also examples of bronze pole finials. The depictions of ge wielded by Shang warriors shown earlier in this article, and even archaic ge pictograms, have a distinct branching to the poles base. This feature resembles a trident in form. Intricate Shang pole finials in the form of an eagle claw have been found that fit this otherwise enigmatic feature (Loehr 1956). These eagle claws are rendered in a quite realistic fashion. This type of finial was not used in later dynasties. It can be surmised that claw finials went out of fashion as it was a motif with cultural meaning to the Shang apart from such claws being a comparatively complex fitting to manufacture.

The addition of plainer cap-like finials to weapon poles became increasingly common during the Eastern Zhou period. These *zun*, and later *dun*, became fashionable in a variety of styles. They were mounted on axes, dagger-axes, ji, spears & pi shafts. The finials of the later type used surface decoration to add interest rather than having ungainly silhouettes. There were however many varieties along the theme of a bronze cap and some still had projections or crooked shapes for visual boldness. Another style of finial, such as unearthed in Eastern Zhou burials in Shangdong province, is notable for having a surface with large studs spaced out across it. These Shangdong examples are paired upper & lower fittings and identified as *shu* [64]. These finial pairings being called *shu* rather than *zun* or *dun* suggests they were capped on either end of a pole which was then used as a staff weapon. Stud projections then may have been both for effect & aesthetics. *Shu* is a name applied to a pyramidal thrusting point mounted like a spear, sometimes with heavy spiked fittings below. Examples of such polearms were found in the tomb of the Marquis of Zeng in 1978 and were dated to the middle of the Eastern Zhou period. *Shu* are then a certain type of bronze tipped weapon used for thrusting and striking.

If cap-like finials in pairs can be called *shu* it raises the question of distinction between ornamental fittings & striking surfaces. What was the function of *zun*? Differences that the Shangdong *shu* finials display when compared to *zun* or *dun* finials mounted with halberds is those '*shu*' have a socket with a purely circular cross section, some are studded, the tops are slightly bulbed and the base finials narrow only slightly and are mostly flat bottomed.

The bronze *shu* which topped weapons poles of the Qin Terracotta Warriors also loosely resemble *dun* but are purely weapon points in that case. The Qin *shu* have a simple point formed on the cap, formed with three steep sides, which visually connects them to the preceding era of 'pyramidal spear' *shu* of the 5th century BC. Their cross sections too are circular.

Even with *zun* finials a dual purpose of decoration and striking function is still possible in some instances. For the purposes of distinction then where the appearances of *shu* & *zun* are similar we can distinguish according to their position on the pole and/or potential combat function. Some *zun* which do seem to be very suited to offensive purposes are associated with the Dian culture of Yunnan province. Simple caps which narrow to a single point are on display at regional museums (at Yuxi & Kunming). 4 examples at the Kunming Museum are attributed to the Dian site at Jinning (Shizaishan) and were clearly useful as striking points.

Similar plain bronze *zun* with very suitable striking points existed in ancient China. One quite plain bronze finial mounted at the base of a spear shaft Yang Hong calls a *dun* and the author explains its role as "protect(ing) the end of the {shaft}...as well as...used for fighting." (Yang 1992.)



Figure 79: Spiked pole finial

63) Yang Shao-Yun: personal correspondence

64) 刘延常 穆红梅 梁法伟:山东省新泰市周家庄周代墓葬;出土兵器的初步研究. 2003-2004

When we see very plain examples, or those that seem to have a suitable striking surface, then we can make such a conclusion. Supporting this notion are bronze finials, in the form of a bronze spike, which are known to have existed on the bottom ends of Greek hoplite spears. Called *sauroter* (lizard killers) their use is still debated. Potentially they could finish wounded enemies on the ground as troops advanced over them, or they could be used to strike if the spear was broken. Other suggestions are that they could be used to set hoplite spears in to the ground, or simply stabilise the weapon end of the spear. These are equally possible uses for a sharp pointed style of *zun*. It really seems common sense that those finials on halberds whose form lent themselves to a combat purpose would at times have been employed at such a purpose.

The finest examples of East Zhou *zun* however are quite obviously ornamental additions to poles for the purposes of beauty and decoration, and some are such great artworks that there need be no other intention beyond this.

In the Warring States period, with the development of fine inlay of silver, there began to appear beautiful inlaid specimens distinct to the earlier styles which had used elaborately cast decorations. Han *dun* also could display detailed surface enhancements with inlaid silver in cloud patterns. Inlay of silver is a feature of other bronzewares of the Han period as plainer forms of bronze competed in decoration with the painted designs available on luxury lacquerware. Silver was chosen more often than gold, as silver is very ductile and silver wire can be worked with ease. The Han appear to have favoured *dun* as finials. The Han military was reorganized and armed with different styles of weapons during the early West Han period. The *zun* type of finial disappears roughly contemporary with the *ge*. The plainer *dun* then becomes the standard. Preceding final obsolescence are examples of Han-era *ge* with *dun* finials within the tomb of the King of NanYue showing a transitional period in the 2nd century BC where *ge* had circular cross sectioned poles.

For individual warriors of high social rank their combat weapons could reflect their personal status. While the top of a pole contained a weapon (perhaps also decorated) the bottom caps of the poles were freer to display fine art or stylised shapes. While some *zun* or *dun* are plain figures 80 to 81 below show either inlay of silver or decorations which arise from a pattern worked into the casting of the bronze. Figure 81 shows a matching pair of *zun* with a beast face design, examples of which have been dated to the 6th century BC (Rawson 1980). The poles for this pair were 2.3cm along the broadest axis of the tear-shape which suggests the pair may be ceremonial if the poles slender dimension was consistent along its length.

The Han used bronze caps on the base of their weapon poles which were a different design to those more popular in the Eastern Zhou. Their *dun* were mostly in the form of stylised segments of bamboo in a cylinder shape. The socket shape of these was consistently an oval, to contrast with the 'tear-shape' which was common on East Zhou *ge* finials. Figure 82 shows a Han-style *dun* & the two *zun* in scale. The measurements are 11.3cm for the *dun*, 13.8cm for the large *zun* and 9cm in length for the silver inlaid *zun*. Their sockets are shown beside, top to bottom in the same order. The typical oval shape of the *dun* is visible while more acute narrowing on one side of the 2 *zun* shows the suggestion of the 'tear-drop' shaped pole. Such cylindrical and flat bottomed *dun* were already used in the Warring States period, as evidenced by one quite plain Qin *dun* which has the name of the infamous minister Shang Yang on it along with the date of 343BBC. (Yates 2007). Another later *dun* pole finial (like a cylinder) being used by the Qin is shown along with wooden remains of a weapon shaft which was uncovered with the Terracotta Warriors (Zou 1991.) This same sort of *dun* was then used by the Han. The stylised bamboo segment is also quite similar to bronze tubes which once decorated parasol poles on chariots.

Figure 80: Eastern Zhou *zun*: Left, inlaid with silver. Right, decorated surface and silhouette.





Figure 81: pair of Eastern Zhou zun. (left & above)
Sockets. Arrows indicate 23mm diameter.

Figure 82: Han/Qin style dun alongside Eastern Zhou zun (below at left).



Sockets for each at right above: Top, dun. Middle & bottom, zun.

Iron & Bronze metallurgy.

For a period covering centuries both iron weapons and bronze weapons co-existed within China.

While bronze casting almost certainly emerged from within Neolithic China as a locally developed technology there is compelling evidence that iron working was introduced to China via central Asia & the steppes [65]. Before manmade iron there was some metalworking of naturally occurring meteoric iron during the Shang dynasty & Western Zhou period. Such meteoric iron can be identified as extraterrestrial due to its high nickel content (Yang 1992.) Heavenly iron was worked into blades that were attached onto bronze axes & dagger-axes. These would of course have been much esteemed. The true Iron Age does not fully begin in China until the Eastern Zhou period, many centuries later. Figure 83 shows a bi-metallic weapon from a preceding experimental phase on display in the Shanghai museum. Both meteoric and smelted iron was found at a notable early site called Sanmenxia in Henan. The first smelted iron would have fulfilled the same role as rare meteoric material, essentially an exotic substitute for the heavenly variety. Smelted iron was not a material which would revolutionise society at that time. The unusual ge in figure 83 is one of these early pieces from the Sanmenxia site. This bi-metallic construction is in the manner of meteoric iron weapons of the Bronze Age. Sanmenxia was dated from between the late West Zhou to the early Spring and Autumn period, which is consistent with the style of this dagger-axe.

Heavenly iron may have created an interest in man-made iron but the physical properties of such early wrought iron would not have matched the best bronze. I believe that such items were more for prestige than to provide any benefit in combat. Even superior meteoric iron blades would only be as strong as the point of bonding. The joining of this iron blade to the bronze body lacks the robust & functional appearance of later Dian culture iron bladed swords with their tangs cast inside bronze hilts. Whatever the nature of the iron here this ge would have primarily been made to be seen, rather than used in battle.



Figure 83: Bronze dagger-axe with iron blade. Late West Zhou/early Spring & Autumn period.

The earliest wrought iron objects in peripheral China were found within the area of modern Xinjiang province, with a conservative dating to the 8th century BC but possibly earlier. Qin state (on the western flanks of ancient China) also has some of the earliest securely dated iron objects within the Zhou sphere, dated to the 6th century BC. These were luxury items, including elaborate short swords with lost wax cast gold hilts.

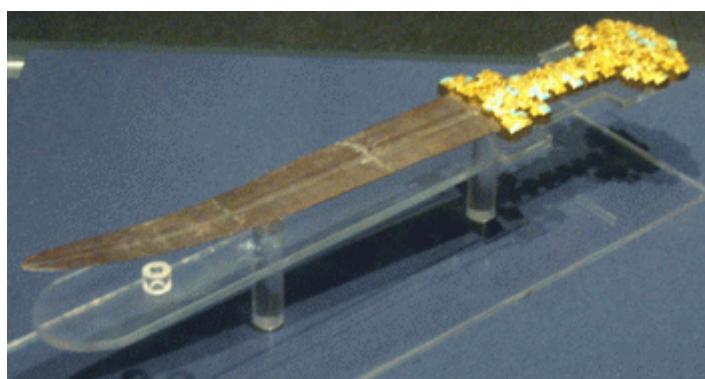


Figure 84: Qin iron dagger with gold hilt with turquoise inlay. Spring & Autumn period.

The form of some of the curved knives in these iron bearing Qin graves suggests a possible steppe connection (Wagner 1999) while conspicuous use of gold would suggest an influence of steppe nomads (Michaelson 2007). It needs to be stressed that despite the presence of iron in these Spring & Autumn period Qin graves that bronze weapons were still used by Qin state to defeat the other Warring States. Even those states armed with iron weapons were defeated by Qin before the end of the 3rd century BC.

65) Donald Wagner: 'The Earliest Use of Iron in China'. 1999.

Qin political and social organisation is credited as a reason for their final success. Whatever advantages lay in iron weapons and armour they were not enough to defeat the armies of Qin who fought with their bronze halberds and whose crossbows fired bronze tipped bolts. As such we can see that the paradoxically early encounters of Qin with iron weapons like figure 84 fill a role as prestige pieces only. Testing of one such Qin short sword showed the iron to have 0% carbon, hence physically softer than bronze. Bronze was not physically inferior to these early wrought iron weapons. Despite Qin states early experience with iron it was not a technology that was developed to replace bronze weapons.

From a beginning as a luxury object, perhaps a substitute for prestigious meteoric iron, the technology slowly filtered through China. Even at the close of the Eastern Zhou period iron was not yet ready to completely replace bronze. Testing of iron weapons dated to the end of the Warring States period showed blades which were produced in such a way that it produced quite a soft microstructure for a steel, and were not better than a good bronze. The mechanical properties of such wrought iron were not qualitatively superior to bronze in hardness [66] although iron was less likely to break under stress. This explains why such early steel weapons were used alongside more typical bronze ge without simply outclassing them. Archaeology shows us that three centuries after Qin rulers first looked upon iron blades the Qin state still worked some iron but did not see fit to replace its bronze weapons.

Iron objects have been found in association with Qin terracotta figures but the items were mundane tools like axes or hatchets. An iron axe belonging to a terracotta stableboy was found in a pit to the east of the First Emperors tomb in 1982. Other axes of iron were found to the northwest in 1981 excavations [67], yet the weapons of the terracotta warriors and also Qin weapons that have been found at other locations in China, are made of bronze. The manufacture of bronze weapons was highly regulated by the Qin state. Inscriptions on weapons with the Buried Army show that the halberds include many different production runs many years apart, some dating to the last years of the Warring States period. The usage of iron for making mundane tools with bronze still retained for combat weapons suggests that bronze was still more highly regarded for edged weapons by the Qin state.

Iron technology as Chinese applied it was initially better placed to revolutionise the production of farm implements rather than supercede bronze weapons. The ancient Chinese pioneered the production of cast iron agricultural tools. The casting of iron implements was only possible because of the high temperature cupola furnaces unique within ancient China. The invention of cast iron is presently attributed to the south of China, specifically state of Wu (Wagner 1993) which had less access to copper deposits than other states. These tools were of cast white iron, very high in carbon content, which means a very hard object, but also brittle. Such iron was unsuitable for weapons so it benefited an agrarian economy but not a military. Cast white iron was a cheaper alternative to bronze tools. Once iron was known to Chinese it is perhaps not surprising the expertise of bronze casting would lead to experiments with cast iron, or that extremely effective furnaces might lead to the accidental discovery of cast iron.

The very high temperatures required to cast iron were not available in other iron working cultures, who instead worked with hammering sponge iron, or blooms, in a pasty state to form tools or weapons. Initially it was wrought iron, made in this fashion, which entered China from Western frontiers. Even after many centuries the level of adoption of an iron industry as a complete alternative to bronze was quite uneven across the various competing states (Yang 1992.). In the Warring States period certain states are mentioned in the histories as wielding remarkably sharp weapons or wearing iron armour, but weapons alone did not decide a victor and they were extinguished nonetheless. Even amongst states that used iron weapons, bronze was still retained for the casting of ge as well as crossbow mechanisms and arrowheads. The slow decline of bronze seems counterintuitive when iron is normally perceived to outclass bronze, but apart from the technical reality there are other cultural factors. Chinese did not have a cultural background which emphasised wrought metallurgy and instead had developed fine bronze casting to great perfection. This is likely why both Chinese & 'Western' bronze & iron working developed along two different general directions: The Western artisans applied hand working techniques on cast bronze while the Chinese used their casting technology on iron.

In the Eastern Zhou period the ability to create a liquid iron allowed new techniques, such as puddling liquid iron and stirring it (*stir-fried steel*) to remove impurities from the iron to make true steel, but the quantities produced were still small. Most weapons excavated in a mass grave of Yan soldiers showed the weapons to be a folded wrought iron rather than folded mid-carbon steel. The steel industry was still in its infancy (Yang 1992). Analysis shows the uneven carbon content between folded layers. Technology had improved dramatically by the era of '100 time tempered' (true steel) weapons of the Han dynasty. Only in the Han period was there industrial output of highly refined weapons-grade steel. A technique for producing a wrought iron straight from the blast furnace had been developed in the Western Han period. In the later part of the Han era there was even true mid-carbon steel being produced by blending pig iron & wrought iron directly within a furnace.

The soldiers armed with iron weapons in the late Warring States period did not have iron weapons that were able to purely outclass bronze. One benefit for those that did choose to develop iron for weapons was that their iron swords could easily be made much longer than bronze swords. The long bronze swords that appear in the Qin Buried Army then are likely mimicking or competing with long iron swords of rival states like Yan but I am not convinced that such high tin bronzes were a good material for making long slender swords. When Chu state graves contain iron swords as long as 1.4m there would have been some pressure on bronze casters to at least match such intimidating blades. 90cm bronze swords in the Buried Army were found with general and officer figures while ge were still the common soldiers weapon.

Bronze was literally reaching the limits of its practical use at the time Qin were producing these long bronze swords. The gradual transition from bronze to iron continued apace as iron working skill increased, and the physical limits of bronze were tested.

66) Donald Wagner: 'Iron & Steel in Ancient China'. 1993.

67) Manying Ip, Duncan Campbell, Gillian Chaplin: 'The Buried Army of Qin ShiHuang'. 1986.

Although knowledge of manmade iron appears to have filtered from westwards, Chinese developed new techniques and technology by adapting pre-existing methods. The peculiarities of Chinese metallurgy, being the use of ultra-high temperature furnaces and fine casting in multi-sectional molds, may also explain two otherwise odd features of Chinese bronze weapons: High percentages of tin are common in weapons. There is also a lack of evidence for work hardening of their edges. Chinese weapons for which I have compositional figures put certain bronzes in the upper limits of practical alloys for a weapon. Many Chinese bronze weapons have a composition of around 15% tin [68].

A tin % above 15% creates a very hard and sharp bronze but one more prone to break rather than compress or deform during stress. A 20% tin bronze (like Qin swords were constructed with) will have a very hard sharp edge but is very much less robust against impacts. In the West there was a method of 'work hardening' of blade edges which allowed for much sharper and harder edges than the base alloy would possess. This required skillful hand working with techniques depending on the alloy and knowledge and control over appropriate metal temperatures. A well hardened bronze edge could be produced and worked wafer thin and the blade itself need not be brittle.

Chinese seem to have abandoned the wrought bronze of the earliest Neolithic experiments and concentrated on casting, while developing a uniquely sophisticated industry they then apparently missed this important technique. High tin % bronzes were instead used for sharp edged weapons, swords being most notable for high tin percentages. Significantly high tin% bronzes are also more difficult to work harden, which had implications for the direction of metallurgy in China: It made the technique less likely to be discovered. A unique Chinese solution to the problem of combining durability/tensile strength with a hard edge was the manufacture of bi-metallic bronze swords.



Figure 85: Bi-metallic sword from Anhui Province. 63cm long/797grams. Both in its weight & dimensions as well as construction this sword is impressive. Contemporary bronze swords were seldom over 50cm long.

(left) Detail of the same sword with precision of edge casting visible.

Figure 86: Detail of another bi-metallic sword showing typical appearance of tin edges with copper spine visible.



68) David A. Scott, Jerry Pondany, Brian B. Considine: 'Ancient & Historic Metals; Conservation & Scientific Research.' 1991.

The Chinese bi-metallic sword of the Bronze Age was a bronze spine with a separate casting of the high tin % edges onto the weapon which thereby avoided the risk of catastrophic breakage.

A normal copper bronze is more likely to take stresses without breaking but did not have the hardness of high tin bronze. A normal blade could not be sharpened so fine so a separate higher tin% edge meant a more lethal blade. By avoiding a high tin % through the cross section, the bi-metallic Chinese sword of this type had the best features of both compositions. The katana for instance was made over 1,500 years after this date but its fame is based around a similar principle, a low carbon steel inner spine with greater impact resistance with a higher carbon harder outer edge for tensile strength & hardness.

In destructive testing of a modern 10% tin bronze sword severe striking stress could deform (i.e bend the sword) but did not break the blade. A higher tin % sword is more likely to crack instead of deform. This was the challenge that bronze casters of these weapons worked with. The apparent omission of work-hardening in China would seem to be a symptom of the unique properties of Chinese technology, as were the solutions.

Such magnificent swords were being made by the YuYue in the early 5th century BC but bi-metallic swords are comparatively rare. We can speculate this is due to the extra effort in such production compared to the quantities of swords needed to be supplied for war. A bi-metallic bronze sword made by casting of harder sword edges on to a separate bronze spine may have simply been too complex to manufacture when arming the huge masses of common soldiers. Certain workshops of the rival states whose fame for excellent weapons are preserved in the ancient histories may have produced such wonderful blades. Ancient sword connoisseurs existed as we know that King Zheng of Qin, who later became the First Emperor, possessed a sword of foreign make which was valued for its quality. This foreign-made sword was then used as a metaphor for his pragmatic employment people of ability that came from outside the state of Qin. Remarkable swords were admired by rulers of the rival states, just as such weapons are admired by people viewing them in modern museums. This is not reflective of the more practical realities of the era. We need to consider that the average car on our present roads is not a limousine. Museums might be potentially misleading.

More typical bronze swords of the Warring States style, even more so than ge of the same period, have a surprisingly high tin % based on the analysis available. The figures for bronze swords often approach 20% tin. Chinese pushed the limits of blade practicality with these higher tin % swords but presumably for short swords actual blade clashings or armour impacts were seldom. Such short swords are depicted in art as being used in grappling situations so a sharp blade may have been more desirable in close & lethal struggles were a coup-de-grace strike must count. Even if the compositions have a certain enigma we can be sure they served their owners well and were fit to the task.

Work hardening was also less likely to be exploited by Chinese artisans as ancient bronze in China typically contained lead. Since Chinese made very fine castings lead was almost standard in the alloy. It meant the liquid bronze flowed much better through a mold but it also meant a softer bronze (Bavarian 2005.) This also points to why certain techniques might have been less likely to have suited Chinese bronze. Lead reduces the effectiveness of cold working a blade edge compared to a non lead-bronze. A high tin % would make harder bronzes but made work hardening even more difficult, with cold working impossible in the upper tin % that Chinese swords & dagger-axes are often attributed. It may have been possible to remove the brittleness of high tin bronze by heating and quenching [69] but to date there has been no evidence or suggestion the ancient Chinese used or knew this technique.

"The exclusive use of casting by the early Chinese metalworkers may have been due to the poor malleability of these alloys". (Bavarian & Reiner 2006.) There was naturally a clear understanding of the different types of bronze produced by different volumes of lead or tin as this manipulation was especially crucial to the craft of Chinese bronzing but *"..the ancient Chinese do not seem to have worked or hammered cast bronzes (in fact, many of the Chinese bronze compositions are difficult or impossible to work by hammering), the only method available to them for changing the properties of the bronze was altering its composition.."* (Scott, Pondany, Considine 1991)

By the Spring & Autumn period a document called the 'Artifactors Record' had a section on "Six Formulas of the State of Qi" which gave the ratio of tin & copper for bronze bells & tripods, mirrors, swords, ge & ji, axes & arrowheads (Yang 1992). The ratio however does not seem to fit what we know about ancient bronze as there is rather less evidence of control for objects like bronze vessels and there are other oddities to the formula. The figures provided have a margin within of 20-25% tin for ge & ji or 25-33% tin for swords. This beggars belief. Rather than an object like a 10% tin bronze this formula would create instead a 'white bronze'. The given ratio from this ancient text should not be taken as gospel, nor the percentage calculated from it. It is unclear whether the ratios meant pure tin & copper each, or an alloy with lead already included. Yang Hong uses both interpretations in his chart, hence the percentage range. Despite this the document is clearly of limited value. The Artifactors Record reveals a clear knowledge over the value of a given alloy, but does not present a practical composition. The calculations from it regarding weapons appear almost 10% higher than testing supports. I tend to regard it as no more reliable than other figures and quoted quantities in ancient Chinese histories which are used (or rather misused) routinely. Likewise, the implications are more important than accepting it as a pure fact. Despite the dubious proportions it reveals one principle which scientific compositional analysis confirms. Certain types of bronze items do have compositions which fall within a certain range. The ancient Chinese desired certain properties in an item and controlled the alloy accordingly.

In the production of weapons the alloy composition was crucial. Unfortunately the much greater attention paid to analysis of ancient bronzes through the study of ritual vessels would seem to offer far less insight into the nature of the bronze casters craft, and their control over composition of a bronze. Bronze vessel can have huge variations on the percentage of lead or tin, by tens of a %, and even with a large base sample it has not been possible to make conclusions over the large variations, such as dating a vessel by its compositional analysis (Bagley 1977). Unlike the huge variance of bronze vessels it has been shown, in general support of the Artifactors Record, that certain types of object are generally clustered under a certain type of bronze alloy (Bavarian & Reiner 2006). High tin % bronze mirrors (white bronze) where created due to the ability of a white bronze to have a fine polish and have a reflective surface.

The very high lead % of Yan state knife-money may either be due to the colour of the bronze produced ('grey') or simply that a lead bronze may have been cheaper to use as a currency. The Artifactors Record fails as a universal standard for anticipating a bronze composition; as well it should given the long history of bronze casting and the many centres of production. There is also reason to believe some bronzes were re-cycled and hence the caster may not always have known the precise proportions, nor may it have been important.

Weapons however are quite different given their function as a life or death tool that must take the stress of striking bone, or potentially another weapon or hard surface. Empirical knowledge of a bronze alloy & its qualities would be crucial. The very small amount of accessible material on analysis of ancient Chinese weapons is a regrettable fact. A rather small sample specifically on ge & ji is available through the English language publication of Yang Hong (Y), 2 ge with analysis in the Shanghai museum (SM), the Chinese text "Ancient Chinese Bronzes" [70] by Zhu Fenghan (Z) and one independent analysis* (see below) which I have combined here.

object	Copper%	Tin%	Lead%
West Zhou ge (Y)	82.72	13.61	0.78
West Zhou ge (Y)	87.44	10.75	0.1
West Zhou ge (Y)	73.38	12.1	12.41
West Zhou ji (Y)	85.42	12.84	0.26
West Zhou ge (Y)	84.31	11.65	0
Warring states ge (SM)	79.61	15.57	3.4
Warring States ge (SM)	80.74	18.09	0.17
Warring States ge* [71]	83.57	15.53	0.02
East Zhou ge (Z)	80.49	18.75	0.72
East Zhou ge (Z)	79.66	16.23	3.44
East Zhou ge (Z)	76.93	13.33	8.47
East Zhou ge (Z)	79.93	13.69	4.21

Some variation is visible even within this small sample. I have set the upper and lower percentages **bold**.

The higher tin % of the Warring States ge may suggest attempt to push the limits of sharp edged and hard bronzes at that time. The % of lead varies from a tin-bronze of 0% lead to another with 12% lead. Assuming this result is not an error from the testing method the 12% lead ge would have a much softer edge than the former. Weapons would naturally want to have low amounts of lead, since only a tiny amount is required if intended to aid casting, but "parade weapons" might be an exception this principle of low lead in weapons (Scott, Pondany, Considine 1991).

While these are not quite as skewed towards a high tin % as the similarly small sample of tested bronze swords I am aware of it does confirm a trend of >10% tin in dagger-axes. These weapons would be capable of holding a sharper cutting edge but at the same time were more likely to chip or break instead of compacting an edge or deforming through critical stress. Other elements in the alloy of >1% I have not included as these are normally impurities of an ore rather than a product of an artisan, although certain ores may have been favoured.

In closing I will discuss another aspect of the testing of the dagger-axe which came as a result of authentication. On the table above the Warring States dagger-axe marked ** is from an unpublished analysis of a privately owned piece. Compositional analysis was done at the same time as metallurgical examination of the internal corrosion. A C14 dating/carbon dating was made of the remains of a shaft which belonged to this weapon. The actual weapon was a two-piece *ji* halberd, and it also had a bronze *zun* mounted on the same pole. The remains of the shaft are shown here before the commencement of a preservation process (figure 87).

The original waterlogged shaft was restored after years of stabilisation and treatment. The organic material of the pole was C14 dated to 400 BCE - 200 BC (sample number, 0611-6A) which is consistent with its Warring States period dating. The metal of the bronze *ge* was tested for internal corrosion and was confirmed as an ancient bronze rather than a modern forgery. The *nei* of the dagger-axe also contained an inscription, which is not visible in these images. This ancient inscription has had the characters translated into a modern equivalent [72] "Dan1 Que4 Tao3(?) zuo4 yong4 ge1 san1 qian1". *Dan Que Tao* is interpreted as a name: Que Tao of Dan. While the less mysterious characters *zuo yong* might often be interpreted as 'made for his use' on such weapons perhaps the phrase might be perceived less personal than that. *Ge san qian* means 'Three thousand dagger-axes'. Que then may have had 3,000 *ge* produced under his authority. The phrase might be a matter-of-fact record: "Que Tao of Dan: produced {for his} use: Dagger-axes three thousand."

Both the spearhead and dagger-axe had been pattern-tinned, meaning tin was applied by a flux to the cast bronze surface to produce a decorative effect. The spearhead has simple tin stripe patterns while the dagger-axe was tin spotted. The original golden lustre of this bronze and the wooden shaft has both been preserved remarkably well despite more than two millennia. The images of the pole here show that this *zun* & the wooden pole were in the typical tear-dropped shaped cross section for halberds of the period.

The purpose of such a detailed investigation is to spot modern forgeries masquerading as artefacts.

69) Jeroen Zuiderwijk: Personal correspondence

70) Zhu Fenghan : "Ancient Chinese Bronzes". Nankai University Press.

71) Melanie Roy: personal correspondence. EPMA testing by Oxford Materials Characterization Services.

72) Stephen Selby: personal correspondence.

Figure 87: Ji halberd. Spear, dagger-axe, zun & lacquered hardwood pole before restoration.



Figure 88: Bronze fittings from Warring States ji weapon.



The ge on a pole with zun attached (figure 89) was in contrast found to be a modern forgery through a similar examination. The zun & ge proved to be modern metal with an artificial corrosion atop once a tiny cross-section of the bronze was inspected. The compositional analysis of the bronze was almost exact to the ge in figure 86-87 (15% tin & >1% lead) yet it was essentially a young face which had put on make-up to look like an old person. The surface of the metal of the zun suggested the object was cast from a mold made from an original ancient object. Under magnification there were signs of the air bubbles trapped by the mold which remained as features above the surface. The forgery is however quite useful for this article in that it show a lacquered pole with black & red designs decorating the surface, a zun in position, and a good copy of a Warring States ge mounted atop. Despite artificial corrosion on the surface of this weapon it represents how the ge appeared when carried into battle by warriors during the Eastern Zhou period.

Reproductions by experimental archaeologists working with bronzes of authentic composition (see figure 90) perhaps show one reason why bronze had a lasting appeal. The weapons made ready for battle would have been highly polished as evidenced by marks of fine abraders on ge surfaces. Polished bronze weapons of typical alloy compositions would have a bright golden lustre. This is the appearance of the bronze that an ancient warrior utilised. I can only imagine the splendid appearance which would be presented by an ancient army that marched with the proverbial "ten thousand halberds" carried aloft.

Figure 89: Modern copy of an ancient ge. Zun & ge on lacquered pole.

Figure 90: Modern reproduction of a European bronze socketed axe.



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